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The Diver's Guide



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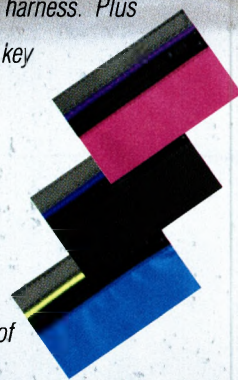
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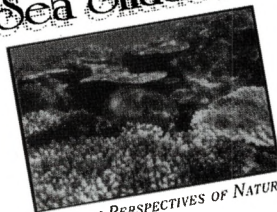
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DISCOVER DIVING®

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A squirrel fish and sergeant fish in the Windward Islands
by Dennis & Karen Sabo

ON THE COVER

Photo by Ken Loyst • This issue's cover features a garibaldi in eel grass with purple urchins at Los Coronados Islands, Mexico. The photo was taken using a Nikonos V with a 15 mm lens and dual diffused MCD strobe. The film used was Fuji 100, an aperture setting of f/8 with a shutter speed of 1/60 exposure.

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Letters to the Editor

More on Dive Insurance

I read your article Dive Insurance: What You Should Know with great interest. Having helped investigate and launch the insurance program for Divers Alert Network in 1986 and '87, I am well aware of the complexities involved in this issue. While your article presents most of the basic similarities and differences between DAN's, DSI's, and ISDA's programs, there are some subtle nuances about DAN's program and about diving insurance in general I would like to point out. First of all, DAN is not a "company" but a 501(c) 3 non-profit organization. Of the three programs described, DAN is the only tax-exempt, public service charitable organization.

One of the distinctions made in your article is that the other policies are based on a per claim basis rather than per year as is DAN's. The suggestion that a policy coverage "per occurrence" is preferable may encourage the belief that it is perfectly acceptable or normal to have more than one dive accident in the same year. Quite the contrary. People who have a dive accident are usually told to avoid diving for 6 weeks to 6 months to perhaps forever.

Rather than include accidental death benefits in our medical insurance, DAN has a separate life insurance program for divers. Including such benefits in medical insurance programs may confuse people into thinking they have more medical insurance than they actually do. As well, many people have accidental death benefits with their credit cards or other insurance policies.

DAN invented divers accident insurance, not to make money, but to solve the growing problem of inadequate insurance coverage by divers - festering - since DAN's inception in 1980. Our prime motivation in creating an insurance program was to minimize delays in arranging air evacuation for serious diving accidents.

The biggest expense in any foreign emergency, diving related or not, is for air evacuation. Air ambulance charges from the Caribbean today typically run \$12-\$15,000. Air evacs from other more distant locations can be \$50,000 or more. DAN's Assist America program, that was introduced in every membership in 1992, and therefore, every DAN insurance policy, has no limit in coverage. This program also covers every dependent member of a participant's family for air evacuation - for any reason.

Because all "insurance" is only a promise to *re-pay after the fact*, having insurance does *not guarantee* evacuation or treatment. No insurance company, nor can DAN, pre-arrange for every air ambulance, hyperbaric chamber or hospital around the world to accept insurance in lieu of payment up front. Insurance is only a "promise to pay later". DAN has, over the years, endeavored to get as many air ambulance companies and chambers as we commonly use, to accept our insurance without cash up front. Some will, but unfortunately, some will not. Most hospitals outside the U.S., for example, do not accept any insurance. For this reason, we contracted with Assist America, to directly provide evacuation and transportation for all DAN members, eliminating the need to verify insurance or determine "who will pay" in the middle of the night.

As stated in your article, many divers may already be covered in part by their own insurance. To determine exactly what divers have in their primary plans, I usually advise obtaining answers *in writing* to the following questions:

Of their primary health insurance:

1. Does the plan cover air evacuation for a dive accident? In the United States as well as from abroad? Any limit?

2. Does the plan cover hyperbaric chamber treatment for decompression sickness or arterial gas embolism? Does it matter if the chamber is outside the U.S. or not in a hospital?

3. Does the plan specifically exclude trauma while engaged in water sports like diving? If not, marine animal injuries and other trauma in or out of the water should be covered. (An animal bite above the water is an animal bite beneath the water.)

Of their life insurance:

Is coverage for death while scuba diving specifically prohibited? (The only reason to have special dive accidental death coverage is if it is excluded or a diver has not life or accidental death insurance at all.)

I hope these additional points help your readers in their dive insurance decisions. The most important point, as you aptly showed in your article, is that all divers need some form of protection against the high costs and delays resulting from inadequate insurance protection.

Thank you for helping to bring home this important safety message.

Sincerely,

Chris Wachholz

Director of Development,
Divers Alert Network



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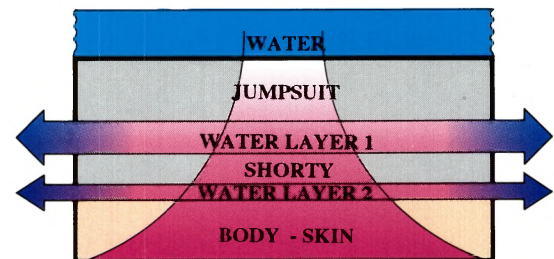
Harvey's baffles the industry with the Reversible Fun Set System!

It's the world's most unique dive suit. You'll stay warmer because of our specially designed jumpsuit and shorty.

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CONVECTION

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CUT AWAY VIEW OF FULL LENGTH JUMPSUIT
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Publisher's Perspective

THE WILD BLUE YONDER

I'm so excited I could even smile in one of my own pictures. I've just established once again that I'm a capable private pilot. Yes, I passed that biannual ritual demonstrating my ability and competence in flying a plane. To my credit, I proved to a flight instructor that I could pilot an aircraft and answer detailed questions about airspace, airports, navigation, piloting techniques, and emergency procedures. I'm excited because I got to show this instructor that I could do what was asked of me. One of the reasons I found it easy to succeed was I had kept current by flying frequently.

Some of you are probably wondering why I bring up something that has nothing to do with diving. Well in many ways it does. In fact, it is one of the most talked-about, recurring controversies in our sport that to this day has not been resolved. Now, I realize that this will open a can of worms... and I may be accused of stepping on some fins... but I feel it's time to once again examine the question of re-certification, without being specific as to what method or criteria is used, the overall concept needs to be examined.

Having just recently returned from the DEMA (Diving Equipment Manufacturers Association) Trade Show in Orlando, I attended several meetings where diver dropout was a topic of discussion. As if it were almost a cyclic topic finding its way into dialogue where diving's leaders assemble, conclusions are offered usually without any solutions. The blame for diver dropout is placed on lack of training (not enough hours, academics, skills training, or openwater dives), lack of confidence, absence of dive partners, or insufficient commitment to the expense of equipment. Rarely have I heard any solutions to these issues. Over ten years ago DEMA allocated grants to instructional agencies to investigate and resolve the dropout question. The instructional agencies answered with simpler course structures and continuing education. But the fact was that 80 percent of the divers back then stopped using scuba after their entry-level training. Ironically, given the changes made over the past ten years several sources set current diving dropouts at higher than 80 percent in today's market. Apparently most newly marketed divers don't continue after being certified.

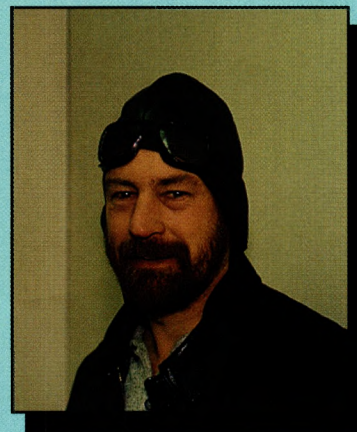
Unfortunately new divers look at certification as the end product. Most people learning to dive just want that C-card. Some just want to dive. A small percentage (20 percent?) will want to learn to dive and will make the commitment to the sport. Because so many are focused on the card as their goal, once it's obtained, the thrill is gone. The card goes in the wallet and there is little incentive to continue diving, unless perhaps a trip to Grand Cayman pops-up seven years later. You can imagine how competent this diver is after such a lapse in diving (no wonder so many of the dive resorts grumble about the ability of the divers they see). Re-certification would eliminate these examples. Certification alone would no longer be the end product. Instead learning to dive would become the reason for taking lessons and staying current would be required to be re-certified.

For twenty-two years I've taught entry-level scuba courses. At the beginning of each new class I'm always asked when the certification card expires. I'm still embarrassed to have to explain that "this C-card is your license to learn and it is good for life." Somehow there seems to be a bit of inconsistency in the thinking of that statement which borders on the illogical. The point is most entry-level students expect their C-cards to expire, that's why they ask when it expires. Driver's licenses expire, pilots licenses expire...

I'm sure most active divers would love to prove their abilities. Such a process would boost confidence levels especially in divers with limited experiences and would keep divers current with changing techniques and equipment. Face the facts, if you don't dive you're not up-to-date. Techniques and technologies constantly change. If you were taught buddy breathing eight years ago and dive with a recently-trained diver you may find incompatible out-of-air techniques. If all you know is buddy breathing you're not current and unless you're an active diver you may not know what you're doing. Re-certification demands you stay active and up-to-date and will prevent grumbling from resorts, boat owners, dive buddies, etc.

Personally I think our sport is afraid to commit to a solution such as re-certification. I mean, every instructional agency would have to agree to such a concept to make it work. If one or two agencies tried it, the other agencies could advertise lifetime certification. That would never work. There would have to be industry-wide cooperation. I know this verges on heresy. Such unorthodox thinking could get me in trouble.

Well, at least I'm still smiling, even if I can't have my way with re-certification... I did pass my flight review.



Ken Loyst
Publisher

**Most regulators
leave you parched.**

**The Oasis 2™
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Parched. That's the way your mouth and throat feel when you use a regulator. Except for one. The new Oasis 2™ from Sherwood. The ingenious difference is a set of gold-plated fins in the second stage that captures the moisture from your breath so that every time you inhale, you're quenched.

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And we even equipped the Oasis 2™ with Sherwood's advanced hi-flow first stage for superior performance. Why settle for a regulator that leaves you parched? Get quenched with the Oasis 2™ available only at authorized Sherwood dealers.

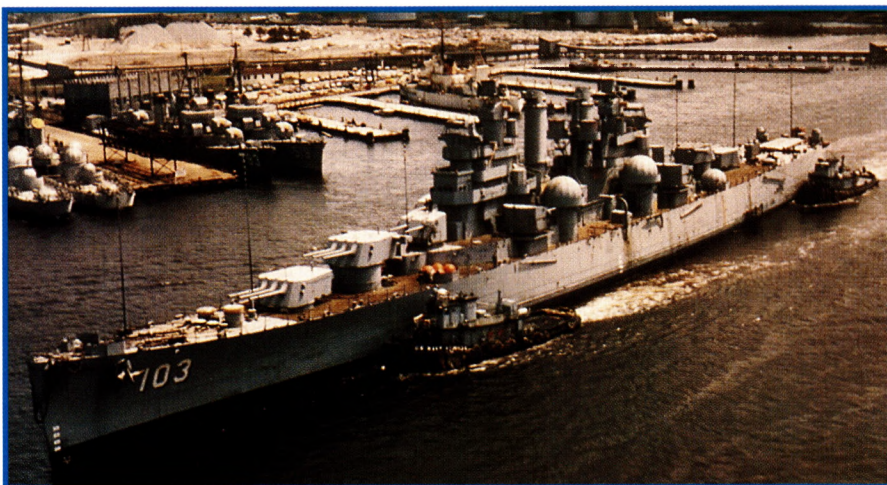
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Above Tugs remove Wilkes-Barre from her anchorage at Philadelphia in preparation for her use in an UERD experiment. **Right** Hank Garvin, a veteran wreck diver from New Jersey, proudly displays a small porthole he recovered from the cruiser.

Photo by Henry Keatts



U.S.S. WILKES-BARRE

World War II introduced a new era of sophisticated naval weapons and delivery systems including powerful torpedoes, depth charges and ingeniously sensitive mines. All can sink ships, but a ship does not have to sink to be put out of action. Direct exposure to a near contact explosion can cause hull rupture and immediate flooding. Such an underwater explosion can shake loose vital equipment including propulsion systems; it can produce damaging vibrations in delicate electronic equipment. Also, it can make weapons completely inoperable. A direct hit therefore is not necessary to produce significant damage. For that reason the Navy established the Underwater Explosions Research Division in 1946. The UERD was chartered to develop technology that would allow ship designers to strengthen the hulls of ships and submarines and to improve shipboard installations. Another

objective was to provide guidance for improved underwater weapon performance.

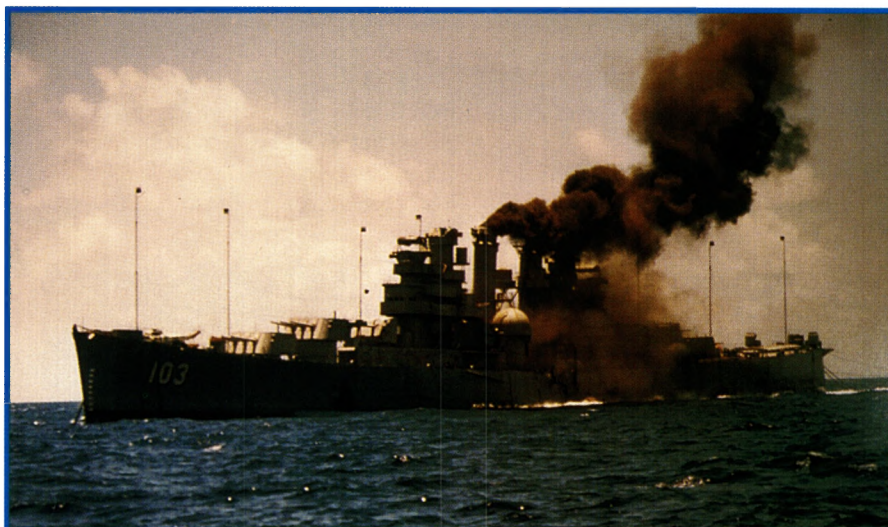
Initially, the explosion resistance of existing hull designs was studied by using large scale models and obsolete submarines. Later, larger ships from the Navy's mothball fleet were subjected to underwater explosions simulating actual weapon attacks. Systems to be evaluated were installed on ships that were then subjected to explosions. The data obtained provided the basis for development of effective structural systems to better protect warships from torpedo attack.

Experiments with a complete ship serve a dual purpose. They provide actual measurements of weapon effects and allow designers to identify weaknesses so that more effective protection can be included in future designs. Shock measuring devices are placed throughout the ship to measure target response. Other measurements are made with velocity meters, string gauges and

accelerometers. All are monitored by high speed recording equipment on a barge nearby the target. After the targets are instrumented, gauge wires are connected to the recording equipment on the barge.

Research of this nature enabled designers to propose equipment that was more shock resistant. It was also invaluable in the development of more efficient warheads for underwater weapons. It was of particular value to determine the minimal amount of explosives required and the best location under a hull for detonation. Such a combination can lead to immediate sinking or severe weakening of the hull structure, leaving the warship unable to perform her mission. In 1971 it was decided to use a large warship as a target for UERD researchers. The 10,000-ton light cruiser *Wilkes-Barre* (CL-103) was selected from the mothball fleet and instrumentation was installed throughout the warship. The cruiser sank within minutes after

Photo by Henry Keatts



Left Brad Sheard, a veteran wreck diver from Long Island, is framed by a rising cloud of sediment from below and his mass of bubbles above as he prepares to enter a five-inch gun turret. **Above** The cruiser settles to the bottom after spewing heavy smoke and breaking in two from explosive charges. The barge on the right was recording the effects of the explosion on various sections of the ship.

by Professor Henry Keatts

LETHAL LADY

the explosives were detonated, providing valuable information to UERD researchers and establishing a new artificial reef to the benefit of scuba divers and the fishing industry.

The *Wilkes-Barre* was one of 32 *Cleveland*-class light cruisers ordered in 1940 to cope with the growing threat of war with Germany and Japan. Several were converted into aircraft carriers of the *Independence*-class. The others carried their own complement of aircraft — four Kingfisher seaplanes that were launched by one of two catapults.

Armament included twelve six-inch guns, twelve five-inch guns, and an anti-aircraft battery of twenty 40-mm and ten 20-mm guns. Armor measuring 1 1/2 to five inches protected sides, decks and gun-houses. The *Wilkes-Barre* was 610 feet long; her beam was 66.5 feet; and her draught was 20 feet. She was designed for a speed of 33 knots and carried a crew of 992.

World War II

The United States was two and a half years into the war with Japan when the *Wilkes-Barre* was commissioned. Another five months elapsed in shakedown, training exercises and travel before she could join the U.S. Navy's Third Fleet in the Pacific. That left only eight months of combat duty for the new warship to make her mark in World War II. And that she did, with four Battle Stars, seven enemy planes downed, assists on four others and three air-sea rescues.

The *Wilkes-Barre* participated in the biggest American amphibious assault of the Pacific war, the invasion of Okinawa.

The invasion of Okinawa was launched on Sunday, April 1, 1945 with carrier planes flying cover for the beachhead. Also, neutralizing air raids punished Japanese airfields in Kyushi, Shikahaki and southern Honshu. Shakashima Gunto, in the Nansei Shoto group, proved to be another key base for

Japanese planes, and was subjected to heavy air attack. Despite those punishing blows, suicidal Japanese air defenders struck back.

Japan's suicide pilots of World War II flew planes filled with explosives, with orders to crash them into enemy ships, focusing on aircraft carriers. Those suicide planes were called *kamikazes*, meaning "Divine Wind," referring to a 13th century vicious typhoon that destroyed a Chinese invasion fleet headed for Japan. Naval historian Samuel Eliot Morison wrote: "Few missiles or weapons have ever spread such flaming terror, such torturing burns, such searing death, as did the kamikaze in his self-destroying onslaughts."

On April 11 kamikaze planes maintained a continuous attack on the American task force from noon till dark. The *Wilkes-Barre* was one of the cruisers screening American carriers. The Japanese planes swarmed like clouds of angry wasps through the heavy barrages of anti-aircraft fire from

the screening cruisers and destroyers. On that day alone, the *Wilkes-Barre* downed a Val dive-bomber and three Mitsubishi "Zeke" fighters, with credit for "assists" on three more.

The "Lethal Lady" of World War II, never far from the thick of battle, always made her presence felt. She survived the war

and 27 years more before she was memorialized, not as a symbol of naval power, but as an artificial reef to serve fishermen of the Florida Keys. Spawned by war and accomplished in spewing death and destruction, the *Wilkes-Barre* has found peace in the docile role of habitat for abundant marine life.

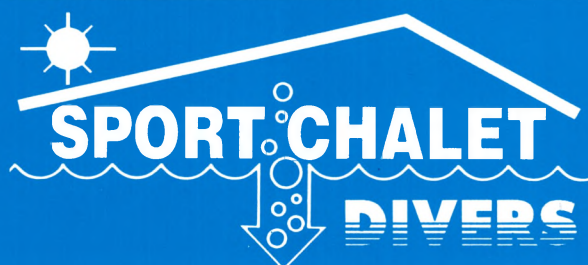
Artificial Reef

On January 15, 1971 the last light cruiser on the Navy list, 27-year-old U.S.S. *Wilkes-Barre*, was struck from the Naval Vessel Register. The "Lethal Lady" of World War II had outlived her worth to the Navy — except perhaps as a target vessel. But she was to provide a more lasting benefit to society. Active environmentalists were applying pressure for the disposal of naval vessels as artificial reefs at strategic coastal locations. One of those was off Key West, Florida. After the *Wilkes-Barre* was designated a target for the Underwater Explosions Research Division, cooperation was obtained from interested regulatory agencies, and the cruiser was cleaned to assure that all potential pollutants were removed from her hull.

The *Wilkes-Barre* was moved into position at 24°-28.8'N, 81°-33.0'W for sinking. On May 12, 1972 two underwater explosive charges were detonated, and the cruiser broke in two.

The two sections of the cruiser settled on the bottom approximately 85 yards apart in about 250 feet of water. The bow portion is on its starboard side but the stern settled in an upright position on the sandy bottom.

Billy Deans of Key West Diver Inc. runs a dive charter boat to the cruiser which is about seven miles south of Saddlebunch Key, approximately 12 miles from Dean's dock. He has been diving the wreck since 1980 and has accumulated a vast background of experience on this deep wreck. Dean maintains a submerged buoy and a mooring line attached to a smokestack on the stern. The top of the smokestack is about 145 feet below the surface; the main deck is approximately 210 feet. These dangerous depths expose a diver to nitrogen narcosis, bends and a host of other hazards.



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Large barracuda, groupers, jacks and schools of bait fish swim about the wreck. Many compartments in the cruiser's superstructure are open and easy to penetrate. Compartments are exposed in the area where the warship split in two, but tangled cables and other debris threaten to entrap an unwary diver.

Visibility is good, usually 50 to 100 feet. Although the water is warm, most divers prefer dry suits because of the long decompression necessitated by the deep dive. A suit of some type provides essential protection from the sharp steel edges of World War II's "Lethal Lady."

**LETTER FROM KAPITANLEUTNANT
HANS-JOACHIM SCHWARZ**

"I thank you very much for the magazine Discover Diving with your contribution of U1105 (March/April 1992). Although I myself have told you the story of the boat, it overcomes me a certain emotion to read it in an American magazine 47 years after the war.

Above all it is very interesting to me, to read the discovery of the boat and to hear about the difficulties of diving, photographing, and entering the boat underwater and removing objects. I congratulate you, Uwe Lovas and your friends for your admirable job!"

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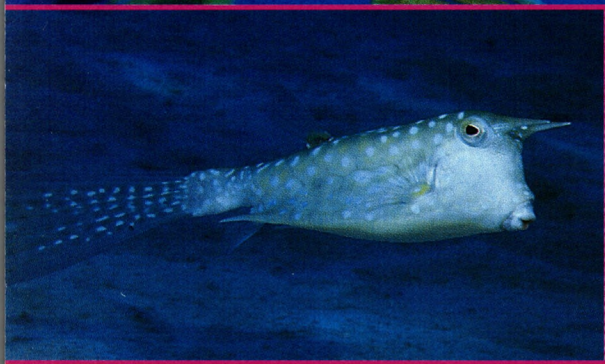
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To Paradise and Sharks

TAHITI/MOOREA

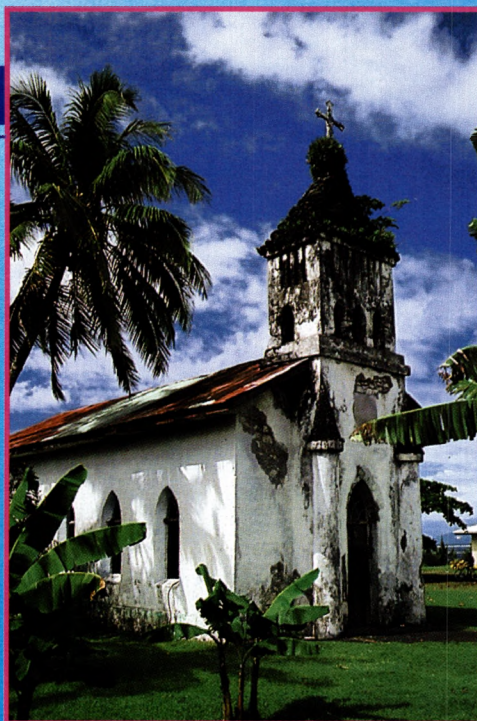
Text and photography
by Walt Stearns



Above *Searching the lagoon floors, one never quite knows what will be found, like this particular cowfish.*
Background Photo *Blackfin sharks swirl the warm waters of Tahiti.*

Like many of the poets, painters and writers who have sought inspiration in the far away islands of Tahiti, I have always felt somewhat of a need to visit Polynesia for my own motivation. However, for me it was not to write a great novel or paint a masterpiece, but rather, to see and photograph sharks in their own realm. To dreamers and tourists alike, these islands in French Polynesia have been the depiction of what true South Pacific paradise is. But Eden, even in the biblical sense, has its serpents, and in the case of the Tahitian Isles, the sharks! Even as I close my eyes now, I can still see the sleek, gray, fighterjet bodies moving in their timeless grace from out of the blue; a blue so chromatic and depthless, it seemed maddening. The amusing point about the whole experience was what I was told beforehand, I might be wasting my time. "The reefs are shabby and the fish life is minute!" Apparently those who issued this warning had never visited Moorea or Rangiroa.

Composed of some 115 islands, covering an expanse of ocean the size of Europe are the Islands of Tahiti. Named after the group's



LEFT: Many churches, from modern to very old, such as this quaint structure, dot the islands of both Tahiti and Moorea. BELOW: One of many flowing, picturesque, waterfalls of Tahiti.

largest island, Tahiti, it's capital city of Papeete is the governing cornerstone to all of French Polynesia. While it may be French now, Tahiti was first discovered by a British sea captain named Samuel Wallis, aboard the *Dolphin*, in 1767. A year later, French explorer Louis de Bougainville claimed the islands for France. Yet, still the most prominent name in Tahiti's history, and for that fact the world, was the ill-fated expedition of the *HMS Bounty* and her captain, William Bligh. Following his going ashore at Matavai Bay in 1788 to collect breadfruit for the English plantations in the West Indies, Bligh's command of the *Bounty* was taken away in the well known, but infamous mutiny.

Like the *Bounty's* mutineers, many tourists are drawn to this corner of the Pacific with their own vision of spending time in paradise. What could be taken as slightly amusing, is that which often transpires upon arrival to FAAA International Airport in Tahiti. To some, the surprise is not seeing pareo-clad natives and grass huts lining the shore, with the quiet crash of the surf in the background, but discovering that this part of Tahiti is a modern, bustling port, with a multitude of cosmopolitan charms. While quite a bit has changed since the days of



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General Information

GETTING TO TAHITI: The Islands of Tahiti lie half way (4,000 miles) between the western coast of the continental U.S. and Australia (3,800 miles). Air New Zealand, Air France, Qantas and Lan Chile are the four major, international carriers servicing Tahiti. The most frequent flights linking Tahiti with the West Coasts of the United States are provided by Air New Zealand and Qantas, and Hawaiian Airlines from Honolulu, Hawaii.

PAPERWORK: A passport is the only documentation necessary for entry, C-cards are needed for diving.

CURRENCY: French Franc, which can be exchanged at the airport. Mastercard and Visa are widely accepted.

WEATHER AND WATER CONDITIONS: Located in the central south Pacific, the weather for French Polynesia is humid and warm, lending to light clothing. Underwater visibility runs about 130 ft. average, with it at times reaching better than 150 ft. Average water temperature runs about 79° F in the winter season and 84° F during the summer. The best diving conditions for water visibility and sharks run between the months of April and November.

WHO TO CONTACT: Since each dive operation has only a limited number of sites, it is highly recommended to plan the length of stay to allow two to three days of diving in a given area, preferably two to three different islands. For booking and/or travel information contact Islands in the Sun (800) 828-6877; or Sea Safaris (800) 821-6670 and (800) 262-6670 in California.

KUDOS FOR AIR NEW ZEALAND:

Going with Air New Zealand from California and back proved to be a highly satisfying way to make the longest part of the journey. For their quite comfortable accommodations in flight, I would like to add a special thanks.

For the ninth consecutive year in a row, Air New Zealand has been named the "Best Carrier to the Pacific" from a poll done by Airline Executive Magazine. Beside the highly rated, on board service, Air New Zealand offers perhaps the most extensive route service to the "Coral Route" (Tahiti, Fiji, Samoa, Tonga and the Cook Islands) between New Zealand, Australia and the U.S. than any other carrier. For more information, contact Air New Zealand at (213) 615-1111.

Captain Samuel Wallis, the islands are still a color-drenched cliché of tropical splendor. Even with my limited schedule of a day and a half, I had some time to kill for a bit of exploring the waters.

The diving around the island of Tahiti may not warrant a trip in itself. The reefs (both inside as well as outside the lagoon) are a far cry from being described as lush, in terms of magnificent, majestic coral formations. What the reefs here do offer is a fairly plentiful assortment of small fish and invertebrates to view. Somehow I feel this was as far as those individuals who gave me warning had gotten. Regardless, spending at least one day here to get wet and oriented before the first leg of the trip begins can make a difference; as well as give you an opportunity to see if everything (dive gear, cameras, etc.) is in proper working order. This is something to consider since local legislation in this French territory limits the number of dives with scuba to two per day. For a diversion from their typical reef fanfare, dive operators have sunk a large seaplane and a ship inside the lagoon at a depth between 60 and 80 ft. for the enjoyment of sport divers.

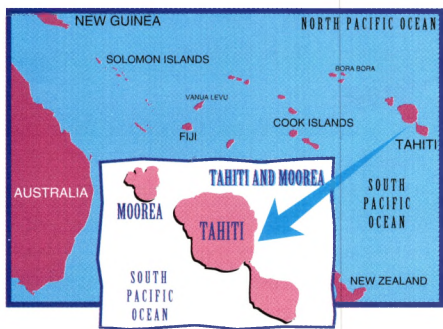
Moorea

Just a mere 11 miles northwest from the Island of Tahiti is Moorea. Scarcely 37 miles in circumference, Moorea presents an

island of spellbinding beauty, with jagged mountain spires built from a volcanic past blanketed in verdant green and bordered by crystalline, blue lagoons, a spectacle befitting to James Michener's mythical island of Bali Hai.

Unexpectedly, the underwater terrain varies greatly from that above. While seen from the air as a near impenetrable ring of coral rising up from the depths, the coral itself tends to be extremely low-growing, seldom reaching more than a few feet above the reef mass. Thus, the reef system appears not to be terribly interesting. However, it is not the formation of the reef that is so dramatic, but rather what cruises around the broad barriers, various passes and outer drop-offs. To the Polynesians, this is the "Kingdom of the Shark."

After arriving at the Moorea Beachcomer Parkroyal Hotel, I met up with Bernard Begliomini from Bathy's Club Diving Center (which is on the hotel grounds) to get underway. Heading straight out from the Beachcomer in Bernard's 18 ft. aluminum skiff, designed to carry eight divers (tight, but effective), the time to each site outside the reef was remarkably short, taking only 5 to 10 minutes, max. My first dive took place in the mouth of a channel going from the open sea to Opunohu Bay.



Sharks

Before leaving the dock, Bernard asked me if I wanted to see a few sharks. I naturally replied with a yes. Big sharks? Why not! After suiting up and entering the water, I, with cameras in hand, Bernard (dragging two sizeable tuna carcasses), and a small group of divers who were obviously starting to have second thoughts, descended to the bottom, at depth of 60 feet. Once there, Bernard was immediately engulfed by a cloud of reef fish frantically picking at the two tuna bodies. In a matter of seconds we had our first round of sharks in view. Small in size (3 to 4 ft. in length with prominent black tips on the fins), they were blackfin reef sharks (*Carcharhinus melanopterus*), the second most common species of shark in Polynesia. Watching them slowly move in closer for an opportunity at the tuna still held in Bernard's hand, I felt transfixed by the eloquent forms. To my surprise, the mood of our toothy friends changed tempo with their rapidly shifting gears to back away. Taking my eyes off of Bernard to look to my right in the direction of the open sea, I was able to see what made the small guys in the gray suits so apprehensive; three considerably larger South Pacific lemon sharks had joined the party.

Considerably larger in size (eight to nine feet in length), the Pacific lemon (*Negaprion acutidens*) with a yellowish/gray coloration and a set of snaggle looking dental work protruding from their lower jaw, surprisingly is not one to be overly worried about. By nature, as sharks go, they are a ponderous creature that like to inhabit the protective waters of tropical lagoons. But that small fact didn't make them any less impressive.

In a seemingly unhurried manner, the first of the lemons soared in to take one of the tunas. With a couple of head shakes, the lemon took half of the fish, while Bernard

still held the tuna carcass by the tail. Following suit, the second shark, as if on cue, moved in the same manner as its comrade for its share of the fish. Like some weird slow-motion dance, all three would move in one by one for their turn at the food, during which time they continued to pay no attention to us. Several minutes later as the last of the tuna disappeared, so did the three big lemons, fading back into the void.

Although this was the last of the lemons for me, I remained on Moorea for a few days to dive with Bernard at a few of his other, equally productive sites. A re-run of the first dive, Bernard would take the lead down to the bottom carrying a bag full of fish carcasses, only to be quickly enveloped again by a tenacious school of reef fish, closely followed by a sizeable group of blackfin reef sharks. Once on the bottom, he would begin to pull a big piece of fish from the bag, like Santa pulling out the first gift before a group of excited kids. Unlike what one would expect from a small group of hungry sharks,

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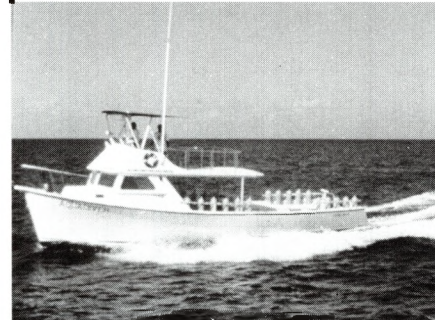
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most of the blacktips preferred to keep their distance, about 10 ft., until something was offered to them. Upon presentation of a tasty morsel of fish, one or two would approach in an almost leisurely fashion to take the food.

Behavioral research has shown that sharks can be somewhat conditioned over a period of time. Having been done on a semi-

regular basis each week for the past several years, it could perhaps be a fair assumption that the sharks here know the drill better than the divers themselves. During this time few mishaps have taken place; minor scrapes and cuts have predominantly been limited to those doing the feeding. Understanding this, it is a good idea not

to wave or flay your hands around in the presence of these predators.

Morays

In addition to the sharks, the reefs are populated with a fair number of large morays in the 3 to 5 ft. range. During one dive, while watching the sharks move about us, I kept feeling as if something else close by was watching me. Turning my head from side to side, and finally looking down by my legs I found not one, but two big (four foot) morays, stretched out half way from the protective cover of the reef, gazing up at me with mild interest. With blunt, powerful jaws, thick neck and motley dark brown-colored bodies, these fellows were not something which could be easily overlooked, yet I managed somehow. This bold behavior, like the sharks, has been the product of long term diver interaction (in the form of feedings by the guides only) with these denizens of the coral stratum. Taking a moment to capitalize on their less than bashful personality, I crept in slowly as not to alarm them for a better angle with a 16 mm lens. To capture them in such a classic pose with heads and upper half of their bodies extended from their lair to further investigate my housing was in the end, a personal thrill.

A Rewarding Treat

For some time, the attitude about the reefs of the Tahitian Islands has been that they are so unimpressive that the sight-seeing and land activities surpass the diving in the excitement category. For this highest of reasons, serious divers have thumbed their nose at Tahiti. But, if the truth be known, while the reefs may lack the more dramatic coral formations and wrecks draped with brilliant soft coral's (soft coral's are near nonexistent in French Polynesia) so prevalent in the southwest and Indo-Pacific, they are not void of life. Moreover, with the growing interest and enthusiasm over seeing sharks, particularly in clear water, how can one say the reefs here are boring? Every dive for me produced sharks, as well as a fair number of vivid, schooling reef fish and other surprises like schools of barracuda or giant Napoleon wrasses.

While Moorea has turned out to be a rewarding treat, there still remains Rangiroa. See ya next issue. 🐼

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People with disabilities are tugging on wet suits and learning how to dive in surprising numbers and they dive with a passion.

In the past, when scuba gear came in one style (big and heavy) the fact that people came in many styles meant that most people could not easily dive. As the industry began to design equipment in a variety of styles, diving became a possibility for more people.

With different styles of gear and different styles of people, came different styles of diving. When legs won't push through the water, arms can pull. Safe diving technique is the only style we will not change.

Can a person with a disability be totally safe in the water? No! Neither can anyone else. Total safety doesn't exist. In many cases, a diver with a disability can be as safe as other divers. The decision to learn to dive is made after a person weighs the fun and adventure against the risk. The opportunity to choose should be available for everyone.

"Diving is a wonderful sport for a disabled person because of the water, the pace and the beauty," says Rachel Brimmer who has FSH Muscular Dystrophy. "I am more mobile in the water than on land.

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His wetsuit is still dripping and his smile is a mile wide. "What a blast! Great Dive!" Then he wipes the saltwater off his wheelchair and heads for the car.

That gives me an incredible sense of freedom I rarely get, even in my electric wheelchair. Scuba diving is best done at a slow, leisurely pace, which means the lack of strength I have is less disabling than in other situations."

Various diving organizations for disabled divers have evolved. The Handicapped Scuba Divers Association (HSA) and the National Instructors Association for Divers with Disabilities (NIADD) both were formed to promote scuba diving as a means of recreation for individuals with disabilities. In the past, there were only two options for a person with a disability who wanted to learn to scuba dive. He could find an instructor who would alter or waive the standards of his organization and he could obtain a C-card, or he could go through the class, learn how to dive but not get certified because he couldn't meet the standard even though he was a safe diver.

Both of these approaches have serious drawbacks. In the first instance, the instructor is not living up to his agreement with this certifying agency. Where do the exceptions stop? In the second case, the student may be a safe diver but cannot get a tank filled on his own merit. In either situation, the instructors may be risking the cancellation of their insurance policies, and although well-meaning, may be unaware of the true limitations of the student.

Text and photography by Dorothy Shrout

Both NIADD and HSA are aware that not everyone is strong enough to be a good buddy, and therefore use a multi-level approach to certifying divers. The first level is an unconditional certification for the person who can take care of him/herself in the water and could help a buddy in need.

The second level is for a person who can take care of him/herself in the water, but for one reason or another could not lend effective aid and assistance to a buddy. This person is certified to dive with two buddies.

The third level considers a person who cannot take care of him/herself in the water. This person is certified to dive with two buddies, one of whom must be rescue trained. Diving for this team is a 'hands on' experience. The able bodied divers must always have hold of the disabled diver.

Why Dive This Way?

Rachel says, "The beauty of life underwater is indescribable."

"Everyday life is a challenge for me," says John, who is a paraplegic, "but this is fun! This is exciting!"

There are approximately 1,300 spinal cord injuries per month in this country. There is no known cure. Add to that the number of people born with limitations and those who develop disabling illness and you will begin to see the extent of the population we are talking about. For this segment of our population, diving represents the greatest freedom they can experience. Gravity is an enemy on land which doesn't exist in the water.

The benefits of scuba diving as recreation and as therapy are just beginning to be explored. Organizations like Ocean Escapes of California, which was created to study and promote sub-aquatic therapy, and San Jose State University, are pioneers in this new field.

Currently two certification courses are available through HSA and NIADD; one for

open water diving and one for instructors. The instructor certification requires that the candidate be currently certified by a recognized agency and actively teaching. Then, in an intensive multi-day course, they are educated in the medical aspects of disabilities, adaptive teaching techniques for pool and open water, and sensitivity training. The sensitivity training is an eye-opening experience for instructors. They enter the pool with one or two limbs immobilized and relearn to dive.

Certification as a NIADD or HSA open water scuba diver requires the same academic training as other agencies. Indeed, instructors are encouraged to use the course materials provided by their primary certifying agency. The differences are in the use of the dive tables and the way that some water skills are accomplished.

What happens after certification? The same as for any group. Some take the course just to say they got certified, some take additional training to gain specialized skills, some dive only locally with people they know, and some travel to dive destinations all over the world.

It won't be long before the sight of an empty wheelchair on the beach or the dive boat is as common as the water we play in. Maybe you should have a leading role in this new trend.

If you would like further information on diving with disabilities contact: Handicapped Scuba Association, 116 W. El Portal #104, San Clemente, CA 92672, (714) 498-6128; NIADD, P.O. Box 112223, Campbell, CA, 95011 (408) 379-6536; Ocean Escapes Inc., P.O. Box 1969, Oceanside, CA 92051, (800) 54-SCUBA; or Houston Disabled Scuba Divers Association, 15215 Blue Ash Drive #1101, Houston, TX 77090, (713) 873-4027.

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At one corner, a diver was talking to the owner of a liveaboard dive boat from half way around the world. He wants to photograph, one of those tiny moray eels with spots all over it. The boat owner assured the inquiring diver he knew exactly where several were. In fact, the boat captain went on to say, their boat visits there very frequently.

Rounding the bend, a large crowd was gathering at a display of underwater camera equipment. They were intensely studying a new underwater camera that they had only read about. It was not due out in the stores for several more weeks but here they had a chance to handle it for the first time. A similar crowd gathered across the isle around a new dive computer. This one could do everything!

From the other side of the hall, there was a scream. A newly certified diver had just won a trip to the Bonaire.

The entire place hummed with divers. Talk of diving was everywhere as was that unmistakable smell of dive gear and underwater adventure.

Consumer dive shows are a fun place to be, where a lot can be accomplished. You can bone-up on the latest diving techniques. Savings on dive travel are substantial and you can get first hand accounts of exactly what a particular island is like. We all know the technology of dive gear is accelerating at an incredible pace. Equipment manufacturers frequently debut new pieces at dive shows. Then there are the seminars, parties, film festivals, and much more. All too often, show attendees find themselves overwhelmed with what they want to do, see and talk about. Below are a few tips on how to get as much out of a show as possible.

Pre-Registration

Perhaps the most important thing you can do to maximize your enjoyment of a dive show is pre-register. Get the show's brochure ahead of time. Often, there are several activities going on at the same time. Some such as the exhibit hall, are continuous. Others are not. Plan your show activities so you can see and do as much as possible.

Pre-registration by mail is simple and will minimize time in lines at the show. It will also guarantee you a seat at that seminar given by your favorite diving author. You'd be surprised how quickly seminars sell out!

Come Prepared

Definitely wear good walking shoes. If you are planning dive travel, come prepared to book your trip at the show. In other words, bring your calendar. Many resorts offer savings for those that book travel at the shows.

Also, bring address labels or a self-inking stamp with your name and address on it. As many as fifty percent of exhibitors offer some kind of drawing for equipment, travel, T-shirts, and more. Then of course, there are the door prizes that the show itself offers. With this many offers, your chances of winning are remarkably good. Address labels and stamps will save you from writer's cramp.

Exhibit Hall

The most popular portion of dive shows is the exhibit hall. Hundreds of booths cover thousands of square feet of nothing but diving related exhibits. But you will want to see it all. Between seminars and films, sometimes there just isn't enough time.

1993 Dive Shows

- Boston Sea Rovers** • March 6-7, Boston, MA; (508) 379-0759
- Ocean Expo** • March 19-21, Miami, FL; (305) 891-6095
- Seaviews'93** • March 19-21, Oakland, CA; (415) 278-6119
- Beneath the Sea** • March 26-28, White Plains, NY; (914) 793-4469
- Mile High Expo** • April 17-18, Denver, CO; (305) 451-1782
- Our World Underwater** • May 7-9, Chicago, IL; (815) 547-2136
- Scuba'93, The Dive Show** • May 14-16, Anaheim, CA; (310) 792-2333
- Sea Space** • June 5-6 Houston, TX; (713) 433-4761
- Underwater Canada** • April 2-4, Toronto, Canada; (416) 495-4245

First off, plan to arrive early and stay late. The crowds are thinner in the morning and the exhibits are fresher. Parking will be easier as well.

Many serious show attendees (those that take in several seminars and films) find that a single day is simply not enough time to see the exhibit hall the way they would like. It may be a good idea to set aside more than one day or the entire weekend to see the show.

Bring a pen and make notes right on the brochures that the exhibitors hand you. This way you will not misplace or misunderstand notes to yourself for future reference. Leave enough time at the end of your day to revisit those exhibits that interested you. This will give you time for more detailed questions you may not have thought of the first time around.

Seminars


By all means attend at least one seminar at the show. Show managers spend a great deal of time arranging for diving experts to speak at their shows. Many of these speakers are the best in their fields. Seminars also offer the knowledge and advice of the experts without a major investment of time and money. Again, if possible, pre-register for the seminars of your choice.

Film Festivals

The next best thing to diving itself is to sit in front of the big screen with projected images of diving. Underwater film festivals are a great inspiration for diving. The works screened at these film festivals are often the best of some of the world's finest underwater photographers, cinematographers and videographers. It is not unusual to see advance footage of a soon-to-be-released film.

Parties

The dive shows are a great social gathering as well. Old friends and dive buddies can meet and exchange dive stories. Several of the dive shows stage after-hour parties for socializing and fun with fellow divers. Some of these parties are benefits for worthwhile charities.

Dive shows can be a boon for the thrifty and time-hungry diver. A great deal can be learned in a very short amount of time. Decisions are easier with all the information available at one place, at one time. But most importantly, the avid diver can surround themselves with the exciting equipment, talk of diving, fellow divers and allow their heads to be filled with dreams of future underwater adventures. 

WINDWARD HO

TEXT AND PHOTOGRAPHY BY DENNIS & KAREN SABO



Ab-bbb Glistening droplets of water rolled off my fatigue body, a welcome relief from the days journey...

THE GRENADINES ST. LUCIA
ST. VINCENT GRENADA DOMINICA



To my right were huge split leaf philodendrons, shrouded by ferns and ivy grasping a miniature rock cliff. My view was stunning... a huge twin masted schooner in the channel below. Where am I? If you said my private garden shower outside my room at Young Island Resort, St. Vincent, you'd be absolutely right.

Welcome to the unspoiled beauty of the Windward Isles. The hot water revitalized tired muscles while thoughts raced to the previous day and a half of air travel from San Francisco. A misconnect stranded us in Miami. The next morning I knew my luck had changed when I reached my departure gate. A sea of black shirts and white collars prompted my huge grin. A pod of priests were travelling on my flight from Miami to Barbados. Hallejuah! Then like a small boy leap-frogging mother nature's leftovers after a spring rain it was an easy jaunt via puddle jumper from Barbados to St. Vincent.

No visual on earth excites me like the low altitude approach into this Garden of Eden. Swirling hues of sapphire, turquoise, and navy blue are splashed across the visible coral reefs, while mountain spikes shrouded in never ending greens reach out piercing the clouds above. All the Windward Isles, Dominica, St. Lucia, and St. Vincent capture these Kodak goose bumps. The absence of high rise hotels often seen in overcrowded tourist areas heightens the sense of adventure.

Where are these isles of paradise? Dominica to the far north, St. Lucia, St. Vincent, the Grenadines, and Grenada make up the Windward Isles; part of the Lesser Antilles. The Greater and Lesser Antilles, commonly known as the West Indies, are formed by two separate mountain chains. Only the peaks of these mountain chains are visible above the sea. This geography provides the dramatic backdrop for the Caribbean's finest diving. Sheer vertical walls, pinnacles, and ancient ships sent to sleep on the ocean bottom provide the exhilaration for vacationing divers.

St. Vincent and the Grenadines lay 100 miles west of Barbados appearing as a slender thread of islands that stitches the surging Atlantic with the tranquil Caribbean Sea. The entire archipelago, some 30 cayes (pronounced keys), appears scattered across the sea. St. Vincent at ten miles long and eleven miles wide is the largest island of the country.

Dinner this night at Young Island proved to be a scrumptious island BBQ buffet. I thought to myself that Gilligan and the Skipper would never had made such a fuss of leaving their island had it been this Caribbean version of paradise. From the lagoon-style saltwater swimming pool to



Opposite page Fish storm

Opposite page top

Aerial shot of Bequia. Right A squirrel fish among a variety of sponge and coral along the reef floor. **Above** Crinoid lacey.



Windward Islands



"Good Morning!" This recognized voice heard morning, noon, or night could belong to only one person; yep, Bill Tewes owner of Dive St. Vincent as he positioned his new *Blue Runner*, a 32 foot cabin cruiser beauty to the Young Island dock. Gear was loaded onto the boat by Bill's staff (one of the last times in a diving week a diver will carry their gear), and off we went. Destination, New Guinea Reef, a mere fifteen minute boat ride. Old salts and first time divers will appreciate Bill's operation which

allows as much freedom or attention as is needed. Sharing the boat with six to eight divers is the norm, but large dive groups can be easily and comfortably accommodated. The proper use of dive computers is encouraged and reef preservation is stressed. Most sites are between fifty to ninety feet, and visibility averages eighty feet plus.

As we begin gearing up, a small manta glides past within yards of the dive platform,

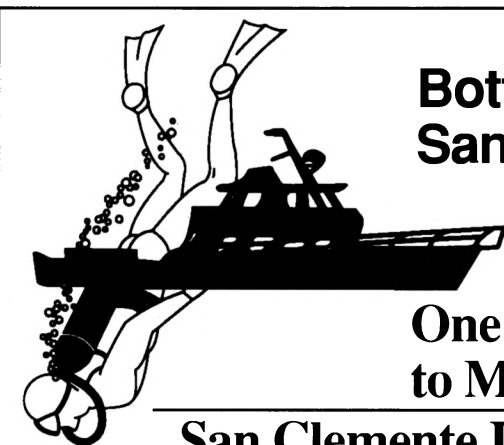
as if to say welcome back. The lagoon provided majestic vistas of St. Vincent's fertile green valleys. Mesopotamia Valley is king on St. Vincent, bursting with coconut, sweet corn, and unusual vegetables like arrowroot. Arrowroot so named because the Carib Indians used it as an antidote to poison arrows, is enjoying a comeback in Mespo, as an ingredient in the making of computer paper. Even the rocks grow in Mespo, as the saying goes.

SPLASH!! My buddy and I were first in. The eighty degree water proved a welcome relief from the sun's heat. We were hoping for an encore performance from our manta friend. A mild current surged life into the three foot wide sea fans and gorgonians that carpeted this sheer vertical mini-wall. All colors of the rainbow were present. Black coral in bush, whip, and tree varieties interlaced with spiral wire coral could be found, some as shallow as forty feet!

Today, New Guinea Reef had rain. Fish storms!! Huge schools of brown chromis and creole wrasse rained down on us. A large southern stingray cruised along the sand bottom off the wall. Crinoids in fluorescent colors peaking out of electric purple vase sponges could be found everywhere. New Guinea is like a child's kaleidoscope, ever changing and always entertaining. Other St. Vincent dive sites are equally inspiring. **The Garden** is a gradually sloping reef blanketed in a finger shaped pillar coral. I have seen a variety of fish life here: reef squid, the white spotted snake eel, a herd of juvenile drums, archer shrimp, scorpionfish, sea horse, and the elusive frogfish. The **Drift Dive** is a series of underwater pinnacles with huge canyons and tons of fish life. Large schools of Bermuda Chub, an occasional nurse shark, barracuda, green morays, and other schooling fish are often sighted here.

Topside

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vistas in the entire Caribbean are Titou Gorge on Dominica, the Pitons of St. Lucia, and the cascading Falls of Baleine on St. Vincent. In addition to the falls, vacationers on St. Vincent can experience Fort Charlotte, an 18th century British fort, La Soufriere (the island's volcano), the petrolyphs of Layou, and the oldest botanical gardens of the Western Hemisphere.

In 1788, Captain William Bligh made his ill-fated voyage on *Bounty* to Tahiti to collect breadfruit; final destination... St. Vincent. After the mutiny, Bligh still determined, returned and sailed 3000 miles to St. Vincent, completing the mission. A tree from the original breadfruit plant still grows on the island.

A wide variety of hotels include the Grandview, a delightful resort sporting a breath taking hillside view of Young Island and Bequia. The Umbrella Beach Hotel is a quaint ten room inn along the water front. An assortment of restaurants and pubs are within walking distance along the twisting path of the breakwater wall. This path connects Dive St. Vincent to the French restaurant to the Umbrella to the Lime n Pub, to the new Browne's Beach Hotel.

Slivers of roasted coconut, St. Vincent's renowned peanuts, and an icy cold Eku beer proved a noteworthy trio back at Young Island. The second beer went down even smoother, when I noticed a strange critter foraging under one of the coconut palms. "What in the world...!" When I looked again, it had disappeared. I thought twice before ordering another beer. Later I learned about the wild *agouti*; a rabbit size, guinea pig-like rodent near extinction, but protected on Young Island. Thankfully, the *agouti*'s are doing what rabbits do best-reproducing!

Our last night was a perfect send off; the weekly cocktail party on Fort Duvernette, a pinnacle only yards off the resort. Young Island's African Queen-style boat transfers guests to this torch lit rock where guests dance and mingle to the local island beat while nibbling on an endless offering of mouth watering munchies.

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Bequia

The next morning we departed for our next island home, nine miles south of St. Vincent; the island of Bequia (pronounced Beck-way). Today, travellers can take a six minute plane ride, enjoy a fifty minute ferry ride, or opt for a taste of nautical history aboard the *Sand Island* (formerly the *Friendship Rose*), a locally designed gaff rigged schooner. With a rich seafaring history and influenced by their most abundant resource, the people of Bequia are excellent fisherman, sailors, boat builders, and whalers.

Though the tradition is now dying out, whaling is a rich part of Bequia's heritage and is the only country approved by Greenpeace to continue this practice. Unlike the mega-powered commercial ships in Russia and Japan, the surviving harpooner, age 71, sets sail with his crew in their 26 foot long Bequian-built cedar boat. Their means of power comes not from large turbo diesel engines, but the wind in their sails or oars in their hands. This proud man poised at the bow with hand thrown harpoons, employs the same techniques used by whalers centuries ago. Whaling in Bequia has never been and still is not an industry for commercial gain.

A pod of porpoises appear and disappear at the bow of our ferry, poising as Bequia's seagoing goodwill ambassador's. We enter Admiralty Bay, disembarking in the town of Port Elizabeth. Only seven miles long by two miles wide, Bequia shines as an emerald island with its own distinct character and island pace. The same architect must have paddled from St. Vincent to Bequia, because a similar snake-like pathway can be found from Port Elizabeth threading a variety of hotels, bars, restaurants, and shops together along the water front. Visitors will find themselves in awe, as this twisting pathway provides an exotic mixture of colors and aromas. Ah-hhh aromas!!! It is amazing how one's appetite grows. A *roti* (row-tee), a delightful local snack of *lambi* (conch), chicken, or beef and potatoes best described as a Caribbean Burrito fits the bill.

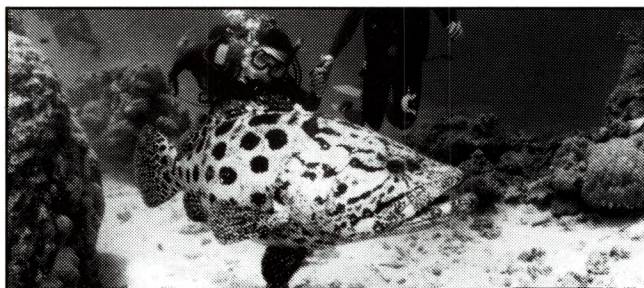
Our vacation home is the Frangipani Hotel, affectionately called the "Frangi" by those who have experienced her island hospitality. Ideally, located on the shore of Admiralty Bay, a five minute walk from Port Elizabeth, life at the Frangi is casually elegant. Eight hillside garden cottages of stone and hardwood construction are reminiscent of an old English castle, perfectly situated to look down onto the bay.



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Diving

Bob Monnens owns and operates the full service dive facility next door, properly named Sunspots. Bob's exuberance for diving and his customers good time is quickly felt. Sometimes a dive operation's appeal is strongly influenced by the people responsible for it. Bob and his staff make you feel like you are visiting long time friends. His 25-foot *SunDiver* easily accommodates his small groups of six to ten divers. Another larger boat is in the planning stage.

Divers are notorious for their fish stories, but the proof lies here in Bequia beneath the azure seas. A friend took an eight week sabbatical to the South Pacific. His log book read like a divers dream list: Vanuatu, Fiji, Coral Sea, Tahiti, the Solomons, and more. After his return he went to Bequia, he said he had one of the best night dives ever. **Devil's Table** was the site five minutes from the Sunspots dock. Here a variety of subjects can be encountered from archer shrimp, coral banded shrimp, five different species of crab,

frogfish, octopus, eels, and the bristle worm from beyond. This "THING", as it is affectionately called, has been seen in Anse Chastanet Bay, St. Lucia and at Devil's Table. It is six feet in length, looks like a centipede, four inches in diameter, and is sensitive to light. It has yet to be identified.

Other sites include **L' Anse Chemin**, the Caribbean's "Underwater Garden of Eden" with a spectacular array of corals and life. I have seen 20 flamingo tongue snails on one seafan at this site. **West Cay** is another divers' favorite. Located at the island's southernmost part, this drift dive offers dramatic contrasts in coral and fish life as two different currents meet. On the Atlantic side of the point, large pelagics such as jack and spadefish can be seen. On the Caribbean side, lobsters, eels, yellow soft corals, and gentle reef fish loiter among the coral and sponges.

After Diving

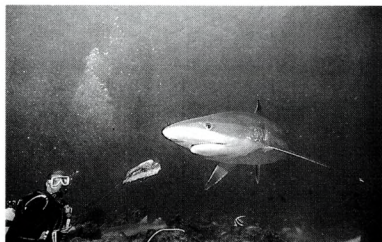
Before leaving Bequia, check out the model boat builders. Skilled craftsmen create beautiful, intricate models; replicas of life-size boats. Nighttime seemed to sneak up on us quickly. Steel drum music floated in and out of the bay. Lively conversations continued at the Frangi bar. A harvest

moon illuminated silent yachts in Admiralty Bay. Faint sounds from an occasional outboard could be heard out in the darkness. Away from the Frangi, the dock lights allowed spears of artificial light to penetrate the clear water, providing a stage spotlight for the fishes dance below. Sounds of the ocean half heartedly splashed against the meandering breakwater wall. Bequia is one of those rare, secluded places that if you run across someone else who has discovered its magic, you immediately feel as if you have something in common even though you may have just met.

We arrived at the new Bequia airport nearly an hour and a half before departure. I asked the airline clerk why we had to be to the airport so early for a thirty mile, 25 minute flight aboard a nineteen seater plane. "In case the plane leaves early," he said with a grin. It did, along with us, and thankfully our scuba gear. Next stop — St. Lucia.

For more information about booking trips to the Windward Isles, contact a dive travel agency, such as Landfall Productions (800) 525-3833; Sea Safaris (800) 821-6670, (800) 262-6670 in CA; Tropical Adventures Travel, (800) 247-3483; Scuba Voyages, (800) 544-7631; Caribbean Adventures (800) 934-DIVE.

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TEXT AND PHOTOGRAPHY
BY MARTY SNYDERMAN

I am here to tell you it's time to make the switch from manual camera systems to the current generation of more automated systems. I am finally, yet firmly, convinced that auto focus, the new exposure systems, and zoom lenses are features to take advantage of if you want to be the best underwater photographer you can be. For a variety of very good reasons I resisted changing to the new technology for years. But finally, my reasons for resisting are outdated. The latest generation of "new" technology has improved to a point that I really am convinced it is time for us to change.

The current generation of camera technology utilizes more sophisticated (and far more accurate) automatic exposure systems, lenses with auto focus capabilities, and zoom lenses. This technology can be found in a variety of camera systems including the Nikon N8008s series, the Nikon F4, the Canon line, Pentax, Minolta and Olympus cameras, as well as the newest of the new, the Nikon RS (Reflex System).

In this piece I am going to discuss why I believe the current generation of technology can make you a better underwater photographer, but I am not going to try to compare the products made by various manufacturers. Most of my experience comes with the Nikon N8008s because that is the camera system I own. But it is a common level of higher technology shared by many manufacturers that makes me realize how far the latest generation of single lens reflex camera systems have come.

I am not saying that the products made by various manufacturers are identical, and that for example the speed of auto focus is as fast for one manufacturer's lenses as it is for another, but the end results are similar. The point I want to make is that the overall level of common technology has progressed to a point that it can make you a better photographer, and it can make you better faster. That is exactly what "new

and improved" technologies should do. You can fill up your library with more images of better quality, in less time, with fewer exposed frames, than you could in years past.

If you have been a regular reader of this column for the past several years, you are probably aware that I was fairly slow to move away from manual camera systems to the early generations of camera systems that relied upon automatic features and functions. I believed that it was best for me, the photographer, to be in control of my camera system. Like a lot of other photographers, I didn't want some computer chip that was supposed to be smarter than me to have more say in determining what my pictures looked like than I did.

In addition, I resisted the change to the new technology of automatic exposure, auto focus, and zoom lenses because I didn't think the engineers had all the bugs worked out. When I tried to use the systems I found too many exceptions to the rules. I won't deny that there were some advantages with earlier generations of "automatic" cameras, but overall I was pretty sure I would get a higher percentage of keepers if I stayed with my manual mode of operation. With the early generations

of auto exposure and auto focus I found that I could manipulate the controls on my old, supposedly outdated, manual camera systems faster than I could on many of the new fangled systems. That was especially true when it came to "fooling the TTL (through-the-lens) metering system" in order to make all those so-called "smart electronics" work right.

As I have written about many times in the past, I have always preferred to shoot macro images with two strobes instead of one. With many of the early automatic systems it was either impossible, or impractical, to shoot macro with two strobes. Some systems were not designed to accommodate two strobes, and many of those that could were so big that they were all but impossible to get into the crevices where so many macro subjects reside.

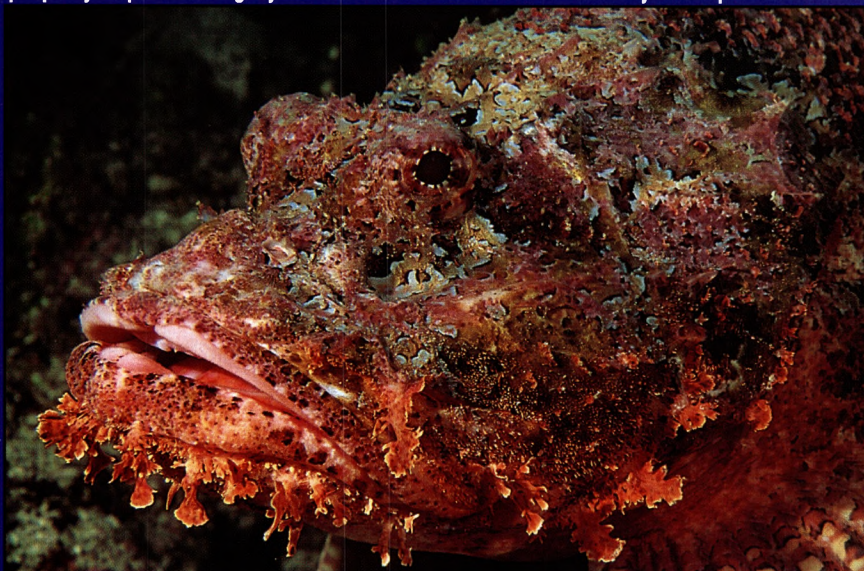
I tried to learn to like one strobe macro images, but I just couldn't do it. I like the soft shadows and the three dimensional look of two strobe macro. For my tastes, too many images were lost with one strobe systems because of harsh shadows.

Over the past two or three years I have gotten very frustrated with my entire photographic system because I wanted to take advantage of all of the latest automatic features, but I didn't find the so-called advances to help me get better results. My keepers-to-throw away ratio seemed to be the same as before. The ratio wasn't any worse, but it wasn't any better either. I think a lot of serious photographers questioned why they should switch to the then new cameras and strobes.

For years I had been using an entirely manual Nikon F2 and two manual strobes for my macro work. I was forced to bracket my exposures, shooting three frames that were composed exactly the same in order to get one frame that I thought would be properly exposed. Every single time I found a subject that didn't swim away, I exposed one frame at the setting I believed to be correct, then one frame with one-stop less exposure, and then one more frame with one-stop more exposure than I started with. No matter what, it took me three frames to get one that was properly exposed. The best "keepers ratio" I could ever expect to get was one out of three, or twelve pictures out of a roll of 36 exposures.



In years past when using a manual exposure system in order to be sure to get one properly exposed image you would have needed to bracket your exposures and...



expose at least three frames all composed the exact same way. With the latest exposure systems which utilize advances in technology for superior communication...



between cameras and strobes, it is possible to shoot images like these in only three frames. This is a huge benefit to photographers because we can all shoot our subjects in more ways, and we can shoot more subjects per dive.

Over the past two or three years I have convinced that auto exposure systems with TTL (through the lens) metering were getting better and better. With a Nikonos extension tube system I found that I could get 36 exposures on a single roll of film to be close to perfect. But in other shooting situations I found TTL exposures to be less reliable, especially in wide angle work with foreground subjects that did not occupy a large percentage of my photographic frame. I tended to overexpose my foreground subject. I could correct the tendency toward overexposure by "tricking the system" (intentionally inputting a higher ASA into the exposure formula than I was actually using), but it seemed like I was having to bracket just like I did with my even older manual system. In addition, I resisted the change in my macro system because I found it difficult to find a two strobe macro system with which I was comfortable.

Recently, however, I put two Nikon SB-25 strobes into Aqua Vision strobe housings to use with a housed-Nikon N8008s.

The N8008s was housed in an Austrian-made SubAl housing. The housing is being distributed through Technical Lighting Control in Santa Barbara, CA. I also had a chance to use Technical Lighting Control's new strobe arms, and I found them to be the best I have ever used. I found it very easy to lock the system down on land so that strobes and cameras didn't swing all over the place, and in the water I could easily loosen the locking knobs so that I could place my strobes anywhere I wanted.

I took the system to the Galapagos and shot ten rolls of macro images with a Nikon auto focus (AF) 60mm lens. The system was set up so that I could use dual strobe TTL. I used the TTL setting with matrix metering and spot metering to give me my exposures. Out of approximately 350 images, at least 340 were properly exposed. Read that line again: *340 out of 350 frames were correctly exposed.*

Never before have I gotten anywhere close to that kind of percentage of properly exposed images. Never, not even close.

Even in water I dive a lot, with subjects I work with a lot. I am not sure how to emphasize it enough, but I have never enjoyed that kind of exposure success. No longer will I bracket for exposure in my macro work, and I won't preach it in this column. This is a huge philosophical change for me. Instead I will preach taking advantage of the new technology in auto exposure systems no matter whose product you choose to buy.

Do the automatic systems of today give you the right exposure 100% of the time? That is certainly a logical question to ask, and unfortunately, the answer is no, absolutely not. But in the tests I have run, my exposures are perfect, absolutely right on the money, a very high percentage of the time. The reason has to do with the fact that the metering systems and the electronic communication between cameras and strobes have reached a new level of performance. I really do not fully understand the technology, but I can see the results. No matter what anyone who still swears by the all manual approach says, they too miss some exposures. This is especially true with subjects that just won't stay still long enough so you can bracket your exposure. I am convinced that I will get back a much higher percentage of properly exposed photos when I use a camera system that utilizes the latest technology than I do when I get one try with an old manual system.

In these same macro rolls I used the auto focus capabilities well over 90% of the time. I found the auto focus to be fast and deadly accurate in most situations. With fast swimming fishes I did occasionally miss my focus even though the system did allow me to trip the shutter, but on the whole my focus was razor sharp. I achieved my focus faster and my focus was more accurate than it generally had been with my old Nikon F2.

In a few settings where my subject was under a poorly lit ledge and when there was little contrast between my subject and the surrounding background, the auto focus system did not work well.

In these situations, using a dive light or focusing light, added sufficient contrast to allow the auto focus to function most of the time. When adding a light didn't work I was able to take advantage of the manual focus mode to take my shot. With some camera housings such as the Aqua Vision housing for an N8008s it is possible to change back and forth from manual focus to auto focus

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while underwater. With the SubAl housing it is only possible with some lenses. With the SubAl housing that I used it was not possible to switch from auto focus to manual focus underwater with the Nikon 60mm macro AF (auto focus) lens.

When I was operating in the auto focus mode, but was having trouble getting a "focus lock", all I needed to do was to quickly decide how close I could get to my subject and then find any object that was approximately the same distance away and which offered sufficient contrast for the auto focus system to work properly. I focused on that object and then locked the focus into place by turning off the auto focus from outside the housing. I moved the focus setting control from the "S" mode (single servo focus) to the "M" mode for manual focus. In this mode I could not alter the plane of focus, but I could lock the focus in place.

Then I would return to my original subject and by bobbing my head to move the camera slightly back and forth I could achieve sharp focus. All of this maneuvering might sound complicated, but I learned how to get my focus within only a few seconds.

An important point to keep in mind is that I was not always shooting subjects that would fit inside the framers of an extension tube. With extension tubes, auto exposure with TTL metering has worked very well for years. But when working with subjects that filled varying percentages of a frame, and with strobe-to-subject distances of two feet and further, the earlier generations of automatic exposure systems had proved less reliable. With the SB-25 and Nikon N8008s metering system my exposures were right on the money frame after frame.

Once again I would like to stress that I am not trying to emphasize a particular brand as much as I am trying to inform you about how well the new technology works. The "electronic brains" that drive the N8008/SB-25 system are essentially the same brains that operate the new Nikon RS system and systems made by other manufacturers as well.

A few weeks after I was able to evaluate my macro work with the Nikon N8008/SB-25 system, I returned to the Galapagos to try to see how the system functions in wide angle situations. I used the auto focus (designated by the letters AF) f/2.8 20mm lens and the Nikon 24 to 50 AF zoom. When setting the system on auto

focus, TTL, matrix metering, and either shutter or aperture priority I got very consistent exposures that I considered to be very good. I think that over the next few months I will discover some shooting situations that "fool" the matrix metering system. However, I believe that there will not be too many of these situations, that I will be able to recognize them, and that spot metering will work just fine in these settings. An example might be a very dark manta ray swimming in a sunburst, or a dolphin framed against sugar-white sand. To date, I simply haven't had the chance to experiment in this type of situation.

One other important feature of the N8008s system is the ability to use the series of new zoom lenses underwater. During my second Galapagos trip I used the Nikon 24 to 50 AF zoom and I got great results. I was really impressed with the sharpness of the images. In photographic terms I was raised to believe that zoom lenses were never as sharp as prime lenses. Certainly that was true fifteen years ago and it was still true five years ago. But the new zooms produce very crisp images and give you the option of having the varying focal lengths of a zoom lens on any given dive. I used the lens behind a flat port, and I was quite happy with subjects that ranged in size from a small grouper to a sea lion. I could not fill the frame with a subject as small as a nudibranch or even a

garibaldi, and a whale shark would prove to be too large. But in many photographic situations, especially when you are working in areas where you really don't know what to expect, I think some of the new zoom lenses will prove to be especially valuable. And I think, though I didn't get the chance to try it, that the right diopter will allow me to use the zoom to photograph nudibranch-sized subjects.

As I have stated in earlier pieces, I think the 20 to 35mm zoom on the Nikon RS system will be a great choice when working with animals the size of reef sharks, sea lions, dolphins, and sting rays. The latest generation of zoom lenses produce very sharp images.

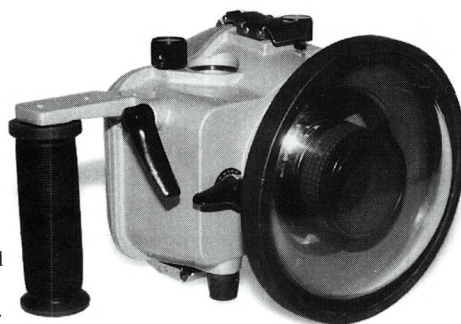
So what are the pitfalls of the new systems? There are some, but the biggest potential problem as far as I can tell is a lazy or careless operator. The current generation of camera systems can not really perform any functions that manual systems couldn't, but the new systems can make calculations faster and more reliably. It is just as important as it ever was for you, the camera operator, to understand the fundamentals of photography. If you don't understand the basics it is impossible to set your system up so that it can take advantage of its capabilities. Nowhere is the expression "garbage in, garbage out" any truer.

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For example, you absolutely must understand the capabilities and limitations of your strobe. You must understand how close you need to be to your subject with any given aperture for the automatic exposure system to have a chance to give you the proper exposure. Exceed that strobe-to-subject distance, and you will be asking your system to do

something of which it is not capable.

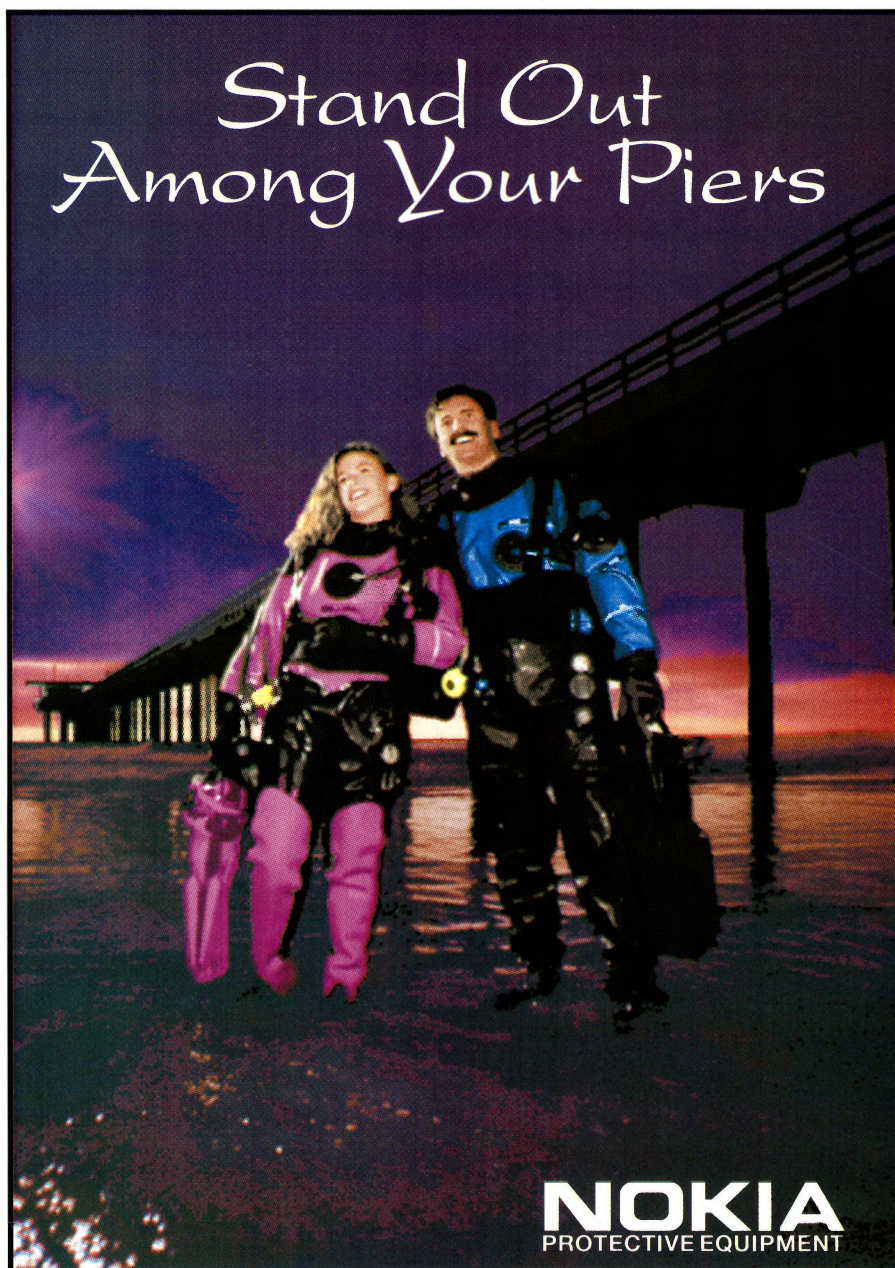
You must also remember to tell your exposure system the speed of your film. On my second Galapagos trip one of the members of the expedition thought his camera was set up to automatically input his film speed. But it was not. He was using ASA 100 film, but his camera system was set up to

"think" that he was using ASA 6400. He had not checked his settings. He had not paid proper attention to the fundamentals of photography. Had we not discovered his error, he would have shot 35 rolls of grossly underexposed film.

It might sound silly at first, but one of the biggest pitfalls of the new systems is that all too often people assume the systems to be so automated that when they turn the camera on, they turn their brain off. Don't fall into that trap.

The latest generation of cameras and strobes can measure light and achieve focus faster and more reliably, and the new zooms are sharper, but the new systems cannot do all of your thinking for you. In order to take advantage of the latest technology, you still must understand photographic basics, and you must pay attention to detail. Much of this thinking and setting up can be done ahead of time, on the boat or on land, before you look through the viewfinder. The ability to set up early allows you to devote more of your attention to the creative side as you compose your image. But even with the best eye in the world, if you don't understand the basics, or if you don't correctly give your system the information it needs, you can still have technical problems that can turn a wonderful frame into disappointment.

Author's Note: For more information on the SubAI housing and other photographic equipment and parts, please contact Technical Lighting Control at (805) 965-4951. 



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photos by Margery Spielman



by Jolee J. Brunton, Ph.D.



Margery Spielman

Look closely at Margery's watercolors and you'll see images within images, shapes and shadows that with scrutiny become animals, flowers, and flights of fantasy. With visual humor Margery translates undersea creatures to butterflies in a garden, cats to fish scales, and does so with an eye to form and color that is most appealing. She visually reminds us that the web of life is intricately and inexorably connected in the most unusual ways. "My intent is to paint images that will inspire hope, wonder, and respect for life, to remind the viewer that everything on our precious planet is connected." She is a diver and an artist, and uses both skills to promote awareness of the environment.

Margery has been involved in art all of her life. California State University at Northridge and Ventura College provided Margery with her formal education in art. She has made art her vocation as well as her avocation for the past seven years developing her talents in watercolor. "It's difficult, even now. Art is the first thing to go in a recession." She is the featured artist for Maui's 10th annual Marine Art Expo running February 1 through March 31 at the Stouffer

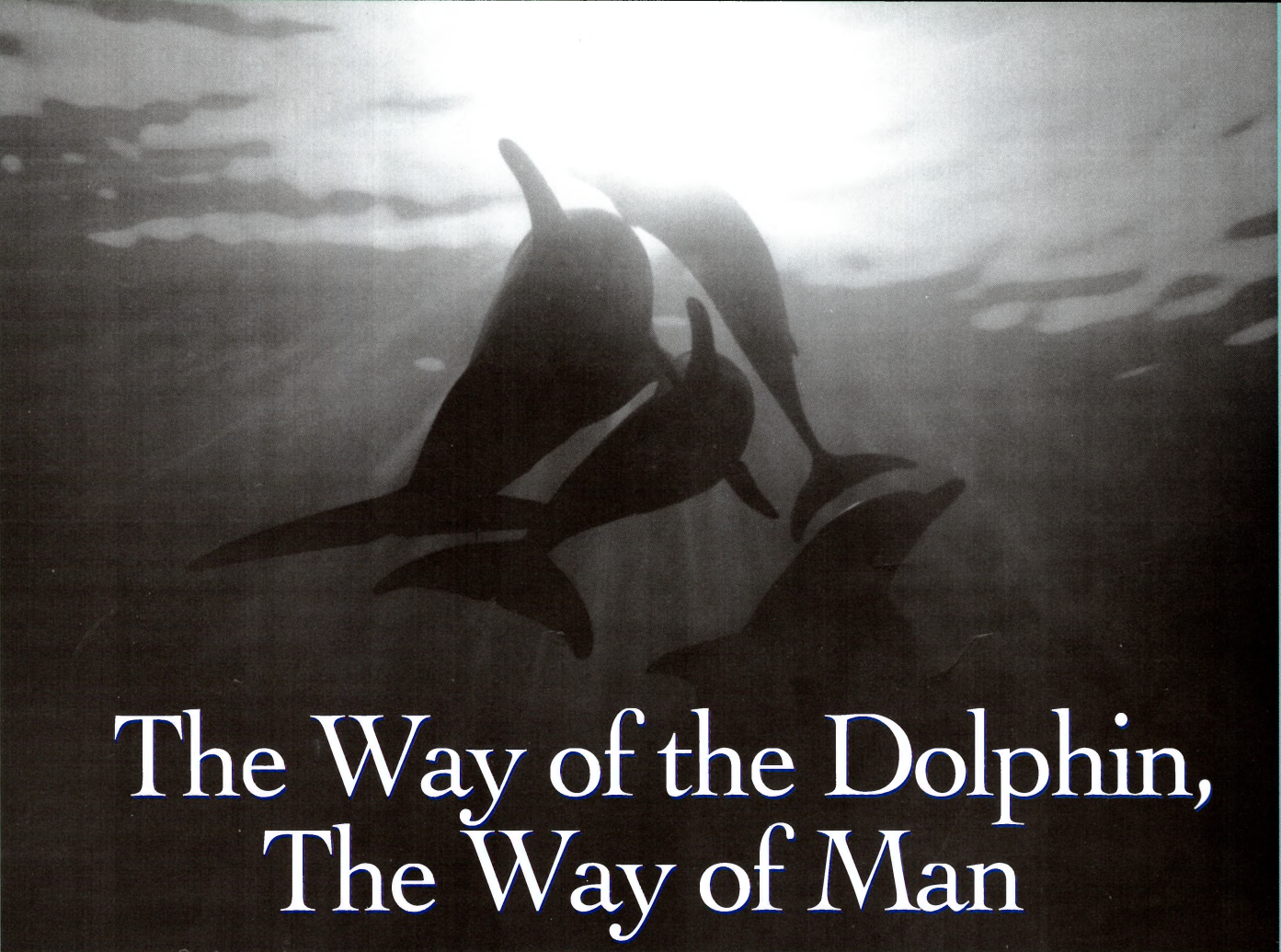
Wailea Beach Resort. She painted the original watercolor used for the Marine Art exhibition poster.

Margery began scuba diving in 1964. "I used to get *National Geographic* as a child. One of Jacques Cousteau's articles just intrigued me. I thought, 'This is what I have to do with my life.' I begged my father for years, and then when I was 16 he gave in and let me take a scuba course. I knew from age eight I wanted to dive." In 1975 she became an instructor and taught diving at Ventura College and Ojai Valley School. In 1976 she got involved with The Cousteau Society. "A friend of mine, Bill McDonald was lecturing for the Society, and he brought me in as an assistant. One thing led to another, I met Jean Michel Cousteau, and started doing art for the Society." Combining diving and art she worked on a variety of projects including co-producing an environmental awareness "Involvement Faire" in Ventura in 1979, and providing research and logistics for The Cousteau expedition in the California Channel Islands in 1986. In 1989 she became one of the first women divers on a Cousteau dolphin expedition off Grand Bahama Island. Her artistic talents have served The Cousteau Society as she has designed several logos for

them, including one for the Parc Oceanique Cousteau and the L'Adventure Cousteau exhibit in Montreal, as well as creating a line of greeting card which is distributed by the Society. Another of her projects for the Society was a poster depicting penguins on an ice flow, which is being distributed worldwide to draw attention to the delicate ecology of Antarctica. Margery is proud of the fact that Jacques Cousteau owns one of her paintings, and has it on display aboard his windship *Alcyone*. Margery has much to be proud of. Last May she was honored to have one of her lithographs presented to Gorbachev while he was visiting in Santa Barbara.

As thrilling as the company of presidents and celebrities can be, Margery describes cetacean encounters as definite peak experiences: "Every year I go to the west coast of the Bahamas to visit the free swimming dolphins. They come right up to you, depending on their moods. Two to 20 individuals will come inches from your face. Incredible! They're my inspiration. We look for extra-terrestrial life, and we have it right here."

For more information about Margery and where you may view her art, write to: Margery Spielman, 1326 Hanover Lane, Ventura, CA 93001; or call 805-653-1970.



The Way of the Dolphin, The Way of Man

Text and photography by Carlos Eyles

Why do dolphins evoke such powerful feelings in us? There are books of every kind regarding the subject. They cover topics ranging from psychotherapy to dreams, from child-birthing to metaphysical channeling. I doubt there is a subject of mystical interest in the human experience that is not covered somewhere in a book about dolphins.

One does not have to look far for an explanation. Our lives, and the substance of the society we created has run amok. We have serious difficulties with values, relationships and family. Our young, improperly nourished, on all fronts, run wild in the streets. We have replaced our sense of play with a work ethic that borders on maniacal. We are a spiritually impoverished and have forgotten how to live well. Really live, in the sense of understanding and participating in the full spectrum of a life, of following our bliss, and of trusting in the perfection of the universe. Don't get me wrong, we want to do these things. We, at some level, understand our compass has broken and have drifted way off course, but because we are fragmented as humans, pulled and torn in every

direction, we don't know which way to turn the ship. We are in search of a captain that can lead us home again.

More than at any time in this millennium people are seeking answers, trying to make sense of the dilemma in which they find themselves.

It Was Not Always So

Long ago and not so far away the earth overflowed with mystery. Nature dominated and man had to look to the shaman or medicine woman for guidance in matters of love, health, family, and social values. The shaman and medicine women were able to move into realms of knowledge that were inaccessible to members of the tribe. They were content to simply be connected to the greater wisdom of the earth by living humbly in balance and harmony with their surroundings. The answers brought back from the Other World by the shaman were consistent with the lifestyle being led and thus were of value. And even though the shaman might speak to stones or listen to trees, or see visions, the laws under which everyone lived were whole and unfragment-

ed, and, most importantly, they made sense. And so it was for several million years.

Eventually that knowledge was wiped out by a different kind of priest. Ones who came from different lands with different laws. Ones who were more interested in power and control than in the balance and harmony.

The damage done was unremitting and total. Great knowledge was lost. The tribal peoples of the earth were betrayed under the cloak of new religion. One that came from outside nature and did not address fundamental understandings about the way things worked. It was the beginning of the end for balance and harmony.

The final blow was delivered with the arrival of still another religion, the one we call science. Science had in its collective mind to redefine the natural world. To unearth all the mystery and reveal it to the cold eye of the microscope. And so it came to pass. They reduced what was once whole into kingdoms, phyla, classes, orders, families, genera, and species. They reduced and divided until there was nothing left but protons and neutrons. In the doing they discovered that the world could

not be dissected into pieces and fragments and still be clearly defined. They discovered that the observer influenced the observed. They discovered that everything is connected. We are all connected. We are connected to each other. We are connected to nature. We are connected to the planet. They discovered what the shaman had always known.

Unfortunately, knowing, that is the intellectual knowing, is not enough. Such stuff is merely information, not knowledge. As any good shaman knows, true knowledge must be acquired through the direct experience. Something three dimensional, (not through the television), something the body and spirit can experience as well as the mind. We often confuse information with knowledge.

It Is One Of Our Problems

These days we intuitively desire someone who understands the whole, unfragmented world, and can help fix us and our broken society. We are looking for a shaman, or medicine woman to listen to the trees and tell us how to find our way back home again. Back to balance and harmony, back to following our personal bliss, back to trusting in the perfection of the universe, back to the joy of play. There are many pretenders to the throne, but none have been able to bear close examination. It is easy to deceive desperate people. So we continue to look for the true sage. One who is mysterious. One who holds obvious secrets. One who's language, whether primitive or advanced, can reveal to us lost knowledge. One from a tribe whose wisdom has remained intact.

Enter the dolphin into late twentieth-century consciousness.

The dolphin embodies all that humans have discarded; all that humans have lost. They live in large families, they play, they make love, they operate out of truth. (Their sonar can "read" an entire bio-physical system in a micro-second. When the truth is not spoken that system changes, thus they can immediately distinguish a lie from the truth. (But of course they don't have to.) Their society works. It has stood the test of time for thirty million years.

It is no wonder so many books are written to feed the desperate longing in ourselves to live in such a society. And why we so relentlessly pursue them in the obscure hope we can learn something and change the direction of our lives, maybe even change our society.

I was not trying to change my life when I encountered dolphins last week. I don't believe a dolphin, or a priest, or a scientist, or a politician can change my life, or change the society in which I am living. I know I can make changes in my life and thus in my society. I am the shaman, the priest, the scientist all rolled into one. We all are. I search for answers in myself. I was not trying to find those answers when I swam with the dolphins last week. It was the last thing on my mind. I wanted to take photographs of those marvelous creatures. But something happened.

There is a single place in the world where wild dolphins will interact with man. (I have learned by rumor that there is another such place somewhere in Indonesian waters, but until confirmed it remains a rumor.) These dolphins are not enticed by food or favors of any kind. They join man of their own free will, and they leave of their own free will. This special place lies on a sizeable sand bank in the Bahamas and has been the source of dolphin encounters for nearly twenty years.

At one time the place of the dolphins was a secret, but no more, the charter boats out of Fort Lauderdale, Florida know their way out to the sand bank, some fifty miles from land, but only one boat, the *Dream Too*, and its skipper, Scott Smith, know it better than anyone else. It was on this vessel that ten underwater photographers from all over the world, including Australians Barry Andrewartha and Kelvin Aitken, headed out for a week on the sand bank.

Photographers are no different than anyone else in society. They know there is a dolphin consciousness and so they fill the demands of society with their photographs. However, to a man, I did not observe that any of them were seeking answers to questions plaguing the rest of society. Only the skipper, Scott Smith raised a lofty question. He did this indirectly during the orientation meeting when we were still at the dock. He placed unusual emphasis on violation of the dolphin's world. "If they don't want us, we will not force it," is what he said in effect. At the time no one was paying much attention. Photographers are an aggressive lot. They were gambling a lot of money on this trip, and by God they were going to get some pictures, whether the dolphin liked it or not. Scott knew better, he had done this hundreds of times. He knew much more than he was letting on.

The first day on the banks we did not spot dolphin until late in the afternoon. The dolphins were swift and the water never deeper than thirty five feet so free diving was the optimum method for encounter. It soon became obvious that the best swimmers and free divers would get the best pictures. Everyone was competing and showing little courtesy to slower divers, much less to the dolphins themselves. Almost immediately the dolphins began to wander off with the pack of photographers in futile pursuit.

In swept Scott on an underwater scooter, on a breath-hold, doing turns and upside down swimming, loops and twists to catch the dolphin's attention and bring them back to the pursuing photographers. One of us caught on right away; Camp, who was not a professional photographer, abandoned the camera and began to dolphin-kick down and mimic the dolphin's movements. The dolphin immediately responded, and swam over to Camp and engaged him in dolphin play while the rest of us burned rolls of film. It was chiefly through the efforts of Camp and Scott that the dolphin remained interested and stuck around. After an exhausting fifty minutes that had us jelly-legged, and gasping, the dolphins grew weary of their sluggish friends and disappeared into the glycerine sea.

While the rest of us babbled on about the shots made and missed, Camp sat by himself in the corner of the boat. "You really got in there among them," I said. "What was it like?"

"I can't really say," he said smiling. "It was incredible. I can't explain it."

Camp is a physician by trade, and doctors generally have explanations for everything. This was a curious departure from my experience. However, at the time it went unregistered. I was too involved with photography to realize that perhaps he had been affected by the dolphins in a meaningful way.

The following day we had five separate encounters. For the most part Camp and Scott swam with the dolphins, imitated their movements, and were accepted into the "water space" the dolphins occupied. At one time Scott, employing his dolphin kick, swam alongside one dolphin when four others came in and enclosed him on all sides, and they all swam as one; members of the same pod. It was a spectacular sight to behold. Not spectacular, that is a photographer's word. It was a wondrous sight. As if one had come upon a

meadow in a deep forest and found a man milling about with a herd of wild deer. It defied logic. Obviously some sort of contact was going on. Some form of communication was at play. But what? Later, I asked Scott if he could enlighten me. He smiled, "No," he said. "I have no words for it. It's beyond words. Beyond thought. It's like something familiar. But it's so deep you can't bring it up."

It was clear I was missing something important. On the last encounter, which occurred in the middle of our dinner at six thirty in the evening, I jumped in the water with photography second on the priority list.

There were four dolphins in the pod. I had recognized one from yesterday. The one Scott called Chopper, who was easily identifiable by a crescent bite, from a shark no doubt, out of his dorsal fin. I dropped down using a dolphin kick. Chopper immediately broke away from his mates and joined me — swimming alongside my right side less than feet away. The speckled, silver body glowed in the low light and its eye, astonishing human-like when seen up-close, gazed at me sleepily. I turned on my back and continued to kick at an angle towards the bottom. Chopper moved closer, swimming inches away; we were belly-to-belly, looking directly into the other's eyes. Scott said it is the only position where the dolphin can see a subject with both eyes. They make love in the same position.

The contact brought about a pleasant feeling. One that is difficult to describe. Light, and warm, as if I was being mildly hypnotized. There was intelligence in the eyes, a depth of knowledge that I did not possess, could not possess, or had once possessed and had lost. All these thoughts, and ideas of what was taking place came to me later. At the time, in the moment, my mind was without thought, blissfully quiet.

An Invitation Was Extended

I placed my hand on the white chest inches away. It felt smooth as newborn skin. My heart slowed and then quickened as if in the first touch of the beloved's hand on the first date with the woman you know you will marry; powerful, exciting, dizzying.

We bent together and rose as one to the surface. There the connection was broken, and Chopper drifted off. (Scott informed me that Chopper was one of only three dolphins of the eighty with which he was familiar that

allowed any kind of touching. Later I tried to touch other dolphins and they would simply move out of reach. Even when I was just inches away they could feel me reaching. I managed to sneak a touch to the side of one dolphin and was promptly smacked on the side of my head with a tail.)

I dived again and Chopper picked me up half-way to the bottom. I could see his eye clearly. The pupil was dark, and the lid was shaded in brown. The eye was wide, very human. There came the feeling, (not a thought), of something from the eye that passed between us. In my ignorance; the ignorance of the tamed and fragmented; the ignorance of the civilized; the message went uncomprehended. The eye, like that of a shaman who knows only the truth, patiently waited for me to understand. I was drawn inexorably into the eye, into the unnamed thing that was being given to me. That was touching me in some primordial place that laid beyond, behind, or buried deep inside my civilized constructs. The entire episode was unfolding like a wonderful dream, one in which I was not the dreamer, but the dreamed.

I knew not of the water, or my breath-hold, or of the depth I was swimming. I was filled with the wise, dark eye brimming with knowledge. A knowledge that had a vague familiarity, like a whiff of untamed smoke hovering in the belly. I reached out and slid my hand along Chopper's side, like the lover who is searching for the hand of his bride. I wanted to embrace Chopper with both arms, wrap my legs around him. Just a flash of desire. Chopper broke off his swim and abandoned me. The bond was broken.

I Wanted Too Much The Undoing Of All Civilized Men

I cannot exactly say what went on during those moments with Chopper. Scott cautioned it was important not to think when swimming with the dolphins. Thinking ruins everything, he said. Thinking just gets in the way.

I believe the dolphin understood my longing for its wisdom. It could feel my need and so did not turn away. The unsaid passes before us all the time in our human world. And we are able to identify much of it. We know, for example, the look of anger, fear, love, and hate. But what does the long steady gaze of a wild creature express? We mis-use

the word wild, for many it has a negative connotation. I prefer untamed or uncivilized (they are sadly synonymous). This look from the untamed eye had no anger, no fear, no hate. The look I later came up with was wise, and dare I say it without sounding corny, love. It was also the look that comes from the supremely confident. Of one who knows not so much the world but knows himself clearly, without a trace of fear or self-doubt. I long to look in a mirror and find those same aspects in myself.

I cannot say if dolphins are more intelligent than humans. They have been around thirty million years longer than humans, and that has to count for something. Particularly considering our five million year history, which, if we continue upon our present path, will bring us well short of that mark.

Dolphins exist in a pure reality that is without deception or illusion. I believe that because of their ability with sonar and echo location to "read" the inner terrain of life forms, that the truth is immediately recognized and all else is dismissed. Thus without anger, hatred, fear, deception or illusion they exist in a reality unlike our own. With that in mind one must ponder what sort of mind or more accurately, what sort of state-of-being could develop in that kind of environment?

We May Never Know

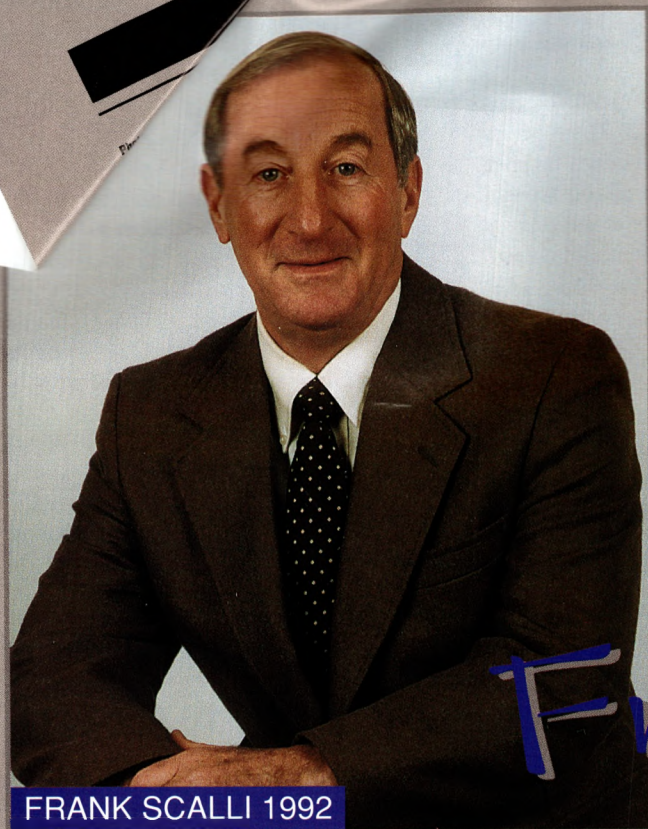
I know that for a moment the darkness that shrouds the civilized man fell away in the light of a dolphin's eye. Ever so briefly the shaman spoke. But alas, I was unable to understand the message. I must become my own shaman, and find my own truths. Become confident in the wisdom that truth will bring, and know myself fully, without doubt. I have come to realize that this is the message of the dolphin; to serve as examples of what life might be like existing on such a plane.

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FRANK SCALLI 1992

Below Treasure recovered in 1968 from the "Spanish Plate Fleet" sunk in 1714 near Ft. Plane, Florida. **Bottom photo** Wreck and lobster diving off the Northeast in 1959.



Frank Scalli

by Eric Hanauer



Frank Scalli was one of the founding fathers of sport diving in the eastern United States, but his influence extended throughout the nation. He helped originate the first national program for sport diving instruction, that of the YMCA. He was also a founder of the Boston Sea Rovers, and one of the originators of their annual clinics. These forerunners of today's film festivals and consumer shows continue to provide instruction and entertainment for new generations of divers. Frank was also instrumental in introducing scuba instruction to colleges and universities, teaching at Harvard, MIT, West Point, and Annapolis. For many years he was sales manager for U.S. Divers. A measure of his stature in the diving industry is that he is the only person to have served on the board of directors of NAUI, PADI, and the YMCA diving programs at the same time.

Like many of the early pioneers, Frank Scalli's first introduction to scuba came in the military. He had been an Army paratrooper, and with three months left in his tour of duty, was sent back to Fort Campbell, Kentucky to await discharge. As the ranking NCO he was given a choice of two or three assignments, and chose that of aquatics supervisor. Frank had no previous professional experience in aquatics, but the Army has its own way of doing things. So they put him in charge of lifeguards at seven swimming pools, a rock quarry, and an officers' lake.

Why aquatics? "I wanted to get my Senior Life Saving and WSI (Water Safety Instructor certifications). They were planning to start the

program after I took over; I always loved the water and it would be fun to have when I got home. WSI was the most difficult thing I had ever done in my life; jumping out of planes was easy by comparison."

While making his rounds, he noticed the guards had a certain technique of cleaning pools. "One day a lifeguard was underwater, picking up hairballs and bobby pins. He had a gas mask with a hose to the surface. When he came up I asked what he is doing. He explained I asked when he was going to do it again. He said this afternoon at the lake. He let me try it in five feet of water, and that was that. No instruction, I put it on and went at it. That introduced me into looking at sand and tiles and I said, 'This is fun.'"

Civilian Life

Three months later, he was discharged. The transition from an active military life to a sedentary civilian one convinced Frank of the need for physical activity, and diving seemed a promising candidate. For once, he would be able to use his negative buoyancy to advantage. There weren't many places selling gear in 1953, and nobody was offering instruction. So he took his new mask, tank, and regulator to the local YMCA pool. Everything worked fine, except his ears hurt and he couldn't figure out why. The next time he tried it, he ruptured an eardrum. "I went home and said, 'There's something wrong with this, I really enjoy it, but it hurts too much.' So I researched it at the library. They talked about equalizing, but it wasn't clear. (The book was geared toward hardhat diving and didn't explain the process.) I figured maybe it was just a bad day. Went back three weeks later and did the same thing to the other ear. Now I figured that this was a bad activity. But nobody would buy the

equipment, so I went back and did some more research."

This finally led him to Woods Hole Oceanographic Institution. There he met chief diver Dave Owen, described by Frank as the east coast version of Jim Stewart. Owen explained the problem, and supplied him with some reading material as well. Scalli asked why more people didn't know about this new sport. Owen explained, "It's not a sport yet."

YMCA

By the summer of 1954, the YMCA had received requests at two other pools from people who wanted to try out their equipment. There were no standards, so Frank wrote out a list of do's and don'ts. Frank was not an educator or a writer; he was a sheet metal worker by trade. But the Y people liked what they read and adopted it.

By this time, Scalli was getting into open water diving. All of it was done alone and without instruction, because he didn't know any other divers. The ocean tempera-

tures off Gloucester, Massachusetts were in the summer. "I did my first dive in the pool in September of '54... no suit, nearly froze to death. Saw some beautiful things on the bottom and got so carried away that I started shivering, and had trouble making it back to shore. There were no suits, no BC's, and I was negative buoyant. I had an army cartridge belt filled with nuts and bolts... no quick release, I couldn't undo it because my hands were so cold. I thawed out driving home, and thought there has got to be a way to stay warm."

Frank heard about Neal Hess, a Harvard student from southern California. Later one of the founders of NAUI, Neal was a Los Angeles County instructor who had some experience with wet suits. "That made me realize somebody else knew a lot more than I did. Up to that point, I had plans to wrap myself in tight clothing. He told me about neoprene." His first wet suit was a kit that he had to put together himself. Frank recalls, "The arms and legs were built like boxes. They were easy to put on, but when you took them off, all the seams opened up. So you spent the next day re-cementing them with Black Magic (neoprene cement), which wasn't magic at all. That made all the difference in the world. I made two great dives on the suit before it fell apart."

"The next challenge was to swim easier on the surface without dropping everything. We played around with the Navy life jackets, but they weren't meant to be used in seawater, the seams opened and they corroded."

About this time, Frank introduced himself to Jim Cahill, a former Navy frogman who had just opened a dive shop in Beverly, Massachusetts. It later became New England Divers, the nation's first mega-dive shop. Jim was teaching a class at the YMCA, but his entire diving background had been with the military. So he and Scalli went to a pool and showed each other what they knew about diving. "That's when I first realized you could take the mouthpiece out of your mouth... before that, it was a part of my anatomy."

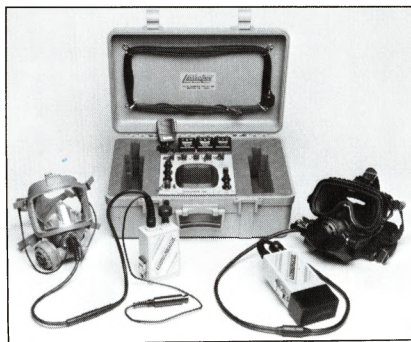
Boston Sea Rovers

By 1954, there were about fifteen divers in the Boston area. Although they were usually diving alone, they eventually got to know each other. In August of that year they formed a club, the Boston Sea Rovers. "We started with seven divers, after two years we

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had twelve." Among the first was Walter Feinberg, an innovator who first suggested the annual shows and clinics.

"Bob Ballard came by the Y one time when I was teaching. He was Naval Reserve, showed up with twin aluminum tanks, said he had to be checked out for some position he was looking for in the Navy. I invited him to be a member of the club. Paul Tzimoulis came on the scene in 1958, through the YMCA program."

At this time, there was no true nationwide program of scuba certification. The YMCA ran its first national instructor course in 1959 in Chicago. Frank was one of of fourteen participants, the only one from New England. Since there were no certified instructors prior to this, they certified each other.

Frank's assignment was to go back to the east coast and run instructor training programs. Tzimoulis was one of the first instructors. Others included Cahill, Fred Calhoun, Frank Sanger (founder of Parkway) and Jerry O'Neill (head researcher in saturation diving for Westinghouse).

Writing and Clinics

Scalli was instrumental in writing the first American textbook on scuba diving. In 1955, he wrote a very basic, three-page instruction guide for the YMCA, consisting of just five two-hour sessions, split between the pool and the classroom. National aquatics chairman Bernie Empleton asked to distribute it nationally. "I took some time and improved it, made it more wordy. The five pages became twelve pages. Nothing really changed. It was survival; the activity was to survive and get home every evening."

This was the lesson plan used in the Chicago instructor institute. When it came time for the YMCA to publish its first full-scale textbook, Empleton turned to Scalli and the Sea Rovers for help. "We worked on the revision of *Science*. (*The Science of Skin and Scuba Diving*, published by the YMCA, was the standard text on scuba into the mid-70's; a revised edition, *New Science of Skin and Scuba Diving*, is still in print.) I was on the national committee with CNCA (Council for National Cooperation in Aquatics) when they adopted that book."

At this time, Frank was still a full-time sheet metal worker. In addition, he was devoting about 50 hours a week to writing and teaching scuba, and working on the Sea

Rovers clinics. "The first one was in 1954. Two years later we had Jacques Cousteau as a guest." How did it get started? "Walt Feinberg felt we should share our knowledge with the community. We brought in Dave Owens from Woods Hole, Harold Edgerton from MIT, local people that we felt knew what had to be done. The Navy sent people from the submarine training tower at New London, including George Bond, who became the father of saturation diving.

"The Sea Rovers did more than just go diving; we felt we had to go out and spread the word. Admission was 99 cents, because the YMCA said if we charged a dollar we

would have to pay taxes. It stayed 99 cents for about three years, till we outgrew the YMCA and had to rent a facility. At first, we had about 180 people in five rooms and an auditorium. Now everybody runs these programs, and we started it. In the beginning, my main concern was safety. It was amazing to see people come up from their first dive with no pain, no tears in their eyes or blood in their nose."

Diving Careers

It was inevitable that Frank would become professionally involved in the diving industry. It happened in 1959. "I convinced one of my students who had money that he

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should open a dive shop and I should run it. I did that for a year, in Everett, Massachusetts, in my home. I was still working my real job, about 40%, trying to find out if I could make a living in diving. One of my students opened a shop in Natick, Massachusetts and I left my job in the sheet metal trade and became full-time in February, 1960. The shop was aquatics and sports, we built an indoor pool... for teaching. The aquatics end did real well and we made money. The winter ski equipment didn't do well and went bankrupt."

Frank wasn't unemployed very long. "Cousteau had an interest in promoting more people to get into diving. Because of his association with Harold Edgerton, he had heard about me and got word to the company that I should be considered as east coast promotion director. I accepted the job three days later. They had just hired Bill Barrada on the west coast; he was my first boss at U.S. Divers."

"He called and asked if I knew what the job entailed. He said, 'I don't know either. Here's what I am going to do. See if we can get a diving program started in universities, places that we can say, 'yes it's being taught here.' With my connections in the Sea Rovers I was able to begin teaching basic diving at Harvard, at MIT (with the help of

Harold Edgerton), and most of the major universities. I did that for a year and a half. This didn't take it out of the YMCA, but opened it for other people to get into the business. Now people were anxious to take diving."

NAUI was founded in 1960, and in an effort to spread nationally, they appointed Jim Cahill to their Board of Directors. Two years later, Jim ran the first ITC in New England, utilizing the same instructors that had participated in the YMCA course three years earlier: Tzimoulis, Sanger, and Scalli. There was no inter-agency rivalry then. "We worked together, we were the same people. NAUI's appeal was that they had financial backing, they had the expertise of the fore-runners of the whole thing, the west coast. A great intertwining of knowledges, personalities, and ethnic backgrounds."

A few years later, Scalli was a consultant to John Cronin when he and Ralph Erickson founded PADI. His role was to assure that lesson plans and textbook material conformed to national standards.

Wreck Diving

Next to instruction, Frank's major underwater interest has been wreck diving. He describes it as, "one of nature's love tokens to divers." His first wreck dive was on the *New Hampshire*, a copper bottom Navy gunship, the sister ship of the USS *Constitution (Old Ironsides)*.

Not all of Scalli's wreck dives were in shallow water. In 1967, he dived the *Andrea Doria*. "The highlight of my wreck diving career. It was still in very good shape, with rows of portholes as far as the eye could see. We didn't get much off of it except a lot of good memories. After Peter Gimbel and the Cousteaus, we were about the fourth or fifth group to dive on it. I still love wreck diving. Lobsters would be second, unless I was hungry."

Training for the *Andrea Doria* was conducted in local quarries, some over 200 feet deep. This is also where Frank trained police to do body recoveries. Until the mid-60s, he and other Sea Rovers were doing recovery operations on a volunteer basis. "We trained the police to do that kind of work at U.S. Divers' expense so sport divers could ease out of it, and rightfully so."


The Sea Rovers came to the attention of *Time Magazine* in the early 1960s. They wanted a photo of a group of ice divers in a

hole in a lake. "Jerry O'Neill, our divemaster, had a home on a lake, covered with 14 inches of ice. I asked him to cut a hole, so we wouldn't be in too deep water. He cut the hole six by six feet, submerged the ice block, slid it over, and six of us were ready to go in. With the safety line, I slipped in first, and my feet hit the bottom; I was waist deep. Jerry had cut the hole right over a sand bar. In order to salvage the photograph I got all the divers on the bottom without fins, and we got on our knees. That's the way it was published."

U.S. Divers and Today

In 1962 U.S. Divers transferred Frank into the sales department. Ten years later he became national sales manager. "My first love was promoting, bringing people into the sport safely, convincing others it's a good activity, and it's worked... after the regulator, I can't think of anything making diving more comfortable than the wet suit and buoyancy. If you are comfortable and know you're safe, you can put up with a leaky mask, a slow leaking regulator or fins that might not be the most comfortable. When all is said and done, the thermal protection and the buoyancy are the major breakthroughs. Electronics may make it but I have to wait and see."

Frank combines diving with charity work on the Seamark Program, an annual fund raiser for the Cotting School for Handicapped Children. This is a social event at the New England Aquarium in Boston, Massachusetts, featuring keynote guest speakers including Bob Ballard, Stan Waterman, Jean Michel Cousteau. With the support of the diving community, they have raised over \$250,000 for the Seamark Vision Clinic. In recognition of his fifteen years of effort on behalf of these children, the clinic has been dedicated to Frank Scalli.

Frank was national sales manager for U.S. Divers from 1972 until his retirement in 1985. He took the job under the condition that he could continue to operate from his home in Massachusetts. In 1992, he was awarded the DEMA Reaching Out Award for long and meritorious service to the diving industry. Pat Barron, current west coast sales rep for U.S. Divers, describes Scalli as "A guy beloved by the whole diving industry. He attacks any problem he sees, can talk to any audience at any time with a story, an anecdote, a funny joke. He just has a zest for life and a zest for people." 

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MIXED GAS AND DEEP DIVING

by Tabby Stone, M.D.

Recreational divers are trained to dive using air as their breathing gas and the training agencies suggest a maximum depth of 130 feet. Commercial divers, on the other hand, sometimes have to work at much greater depths. Mixed gas diving is a technique which allows the diver to do this. While air is technically a mixture of gases, this discussion will focus on other gas mixtures used for deep commercial diving.

Most recreational diving and most shallow professional diving is done using air because it is readily available, cheap and easy to work with. Unfortunately, humans aren't designed to breathe any gases at higher than normal pressures. We all learned about the problems caused by breathing air under pressure in our basic diving classes. When we compress air, the partial pressures of each of the gases in it rises as total pressure rises. The combination of time and pressure leads to a build-up of dissolved nitrogen in our tissues and the potential for DCS using appropriate decompression schedules can minimize this risk. But DCS isn't the limiting factor for air diving. At higher than normal partial pressures, nitrogen causes narcosis. Most divers can adapt to the small amount of narcosis produced at shallow to moderate depths and still perform tasks. But at greater depths, the narcotic effect cuts down the ability to work effectively and eventually becomes dangerous to the diver.

The simplest way to combat narcosis would be to take the nitrogen out of air and breathe pure oxygen. Unfortunately, this doesn't work because there is a risk of central nervous system toxicity, including seizures, when exercise is combined with breathing pure oxygen at partial pressures above 2 ATA (33 feet of sea water). Thus, oxygen breathing isn't the way to avoid narcosis.

Since we can't just get rid of the nitrogen, we have to replace it with something else. Mixed gas diving is the technique of

blending the oxygen we require, with another gas or a combination of gases to allow deep diving without developing narcosis.

Blending gases also allows the percentage of oxygen to be decreased in mixtures used for very deep diving. If the percentage of oxygen in the mixture stayed the same as it is in air (about 20% for ease of calculation) then the partial pressure of oxygen would reach 2 ATA at 10 ATA (330 fsw). Normally, the partial pressure of oxygen is kept well below 2 ATA because oxygen is also toxic to the lungs. During prolonged exposure situations, such as saturation diving, the gas mix usually has a partial pressure of oxygen of 0.3-0.4 ATA at the working depth. In the short term, we can safely tolerate between .16 ATA and 1.6 ATA. A gas mixture containing 10% oxygen, for example, would allow diving between 21 and 495 feet of sea water as long as the time at the maximum depth wasn't more than 45 minutes.

Helium

While a number of gases can be used to replace nitrogen in the diver's breathing mixture, helium is the one most commonly used. Experimental diving with helium-oxygen mixtures was first tried in the 1920's but mistaken assumptions in designing the decompression schedules led to problems. The first practical uses of helium-oxygen mixtures for deep diving came in the 1930's.

The physical properties of helium are important to divers. It is less dense than air and diffuses at a faster rate. It conducts heat much faster than air and sound travels faster in helium than in air.

In very deep diving the lesser density of a helium-oxygen breathing mix can be helpful since it decreases the work of breathing. The increased thermal conductivity, however, can lead to significant heat loss and hypothermia in divers. By 800 fsw the respiratory heat loss is equal to the entire metabolic heat production. Thus, on deep or pro-

longed dives, the gas mixture has to be warmed and careful attention must be paid to chamber temperatures during saturation or decompression diving.

Almost everyone has heard the "Donald Duck" voice produced after someone breathes helium from a balloon. The voice changes because sound travels faster in helium than air, and because our vocal cords and the resonating gas-filled spaces are designed to produce normal sounds when vibrating air. While the funny sounding speech may be mildly amusing in a party situation, it makes communication difficult when divers work in helium-oxygen mixtures. Electronic devices can be used to make the speech more intelligible.

Divers using heliox sometimes develop crackling or popping sensations in the joints or joint pains on descent. This is called hyperbaric arthralgia. It is probably related to fluid shifts in the synovial fluid which lubricates the joints caused by an imbalance between the inert gas concentrations in blood and synovial fluid. It occurs less often if the rate of compression is slowed and improves after some time at depth.

Because of its solubility in lipid tissue (fat), scientists had predicted that helium might have some narcotic effect on divers beginning at around 1,400 feet. It turns out that divers develop neurological problems at much shallower depths when using helium-oxygen mixtures. These usually begin with tremors, followed by muscle twitching, poor performance of tasks and sleepiness. Characteristic changes in EEG (brainwave) patterns can be seen. Animals compressed to great depths have developed seizures. While tremors sometimes begin as shallow as 300 fsw, most of the symptoms are associated with dives to 600 fsw and deeper. This is referred to as HPNS or the High Pressure Neurological Syndrome. The etiology of HPNS isn't fully understood. One theory

suggests that helium induces a change in the surface tension of the nerve cell membrane causing it to shrink and the narcotic gases cause changes which expand the membrane.

Since helium acts as a neurological stimulant when causing HPNS, the technique of adding a small amount of a narcotic gas such as nitrogen to the mixture to decrease the symptoms was developed. The incidence and severity of HPNS can also be decreased by slowing the rate of compression and making compression stops. In experimental chamber dives to 2,000 feet and more it may take several days to reach the final depth.

The combination of nitrogen, helium and oxygen is called trimix. Trimix is a generic term for the combination of gases, but not the exact concentrations. The percentages may be changed depending on the working depth in order to keep the diver from developing HPNS, narcosis or oxygen toxicity. Reduction of HPNS isn't the only advantage of this combination. Less helium is used, decreasing costs. The thermal conductivity of the mixture is lower leading to less heat loss and the density higher, so voice changes are less. But trimix is denser than heliox which increases the work of breathing.

Other Gases

Helium is the inert gas most commonly used for diving, but it isn't the only one. Hydrogen is another low density physiologically inert gas. Like helium, it is associated with HPNS. Unlike helium, it is easily and cheaply generated. Hydrogen's main disadvantage is that it isn't chemically inert. If the proper concentrations of hydrogen and oxygen aren't maintained there can be an explosion hazard. Because of this, it is less commonly used in diving.

Neon can also be used in breathing mixtures. Like helium it is both physiologically and chemically inert. It doesn't cause narcosis. It is denser than helium so the problems of heat loss and voice change are lessened. But it is even more expensive than helium so it isn't commonly used.

Decompression in Mixed Gas Diving

Changing the gas mixture doesn't change the gas laws. While we usually think of DCS in terms of nitrogen, any inert gas we breathe can build up in the body and cause DCS. Decompression tables have been developed for use with the various gases used in mixed gas diving. Since the concentrations of the gases may vary during a dive, the tables are usually designed to use a combination of partial pressure and time rather than depth and time.

For several reasons, the gas mixture may need to be changed during decompression. The oxygen content which produces the proper partial pressure of oxygen at great depth may not be sufficient to support life near the surface. Pure oxygen breathing may be used at shallow depths to speed decompression. And eventually the diver has to return to breathing air at the surface. Sometimes changing the gas mixture without any change of depth can lead to bubble formation due to a phenomenon called isobaric counterdiffusion. Not all gases dissolve at the same rate or diffuse (move) into tissues at the same rate. When the inert gas in a breathing mixture is changed, a faster diffusing gas may enter tissues before a slower diffusing gas leaves. This leads to an increase in total inert gas pressure and sometimes to bubble formation. Clinically, the results may be superficial problems such as itching and a rash similar to that seen in the usual decom-

pression sickness. Rashes are more common when the breathing mixture is different from the atmosphere around the diver. Deep tissue bubbles may also occur from gas switches. The increased incidence of inner ear decompression sickness in deep heliox diving is probably related to isobaric counterdiffusion.

Problems related to gas switching are most common in very deep diving. They have been described when switching between air, hydrogen or neon and helium. To decrease the risk, the ambient pressure is often increased slightly as the switch is made. Gradually switching mixtures and switching gases shallower than 100 feet also helps reduce this problem.

Conclusions

Using gas mixtures other than air allows divers to go deeper and remain able to function without developing nitrogen narcosis or oxygen toxicity. This type of mixed gas diving is normally used by commercial divers when they work deeper than 150 fsw and it is sometimes used at slightly shallower depths.

Mixed gas diving can be safe when done properly, but appropriate training, equipment and adherence to strict safety precautions are needed to do it properly. It involves a degree of planning and support usually not available to recreational divers. For all but short bounce dives to less than 300 feet, prolonged decompression often is best accomplished with a chamber or bell system may be required. The gas mixing equipment must be properly maintained for use with oxygen and the resulting breathing mixtures carefully tested. While it's possible to fill a standard scuba tank with heliox mixed appropriately for the working depth, it's more common to use surface supplied gas. Sometimes special rebreathing scuba systems are used. These rebreathers allow recapture of expensive gases, the ability to vary the gas mixture, and better mobility than is possible with surface supplied gas.

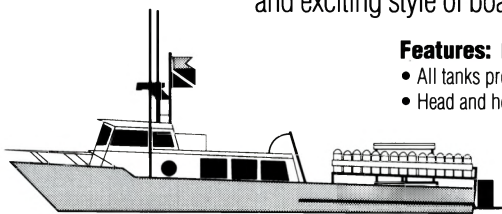
By understanding the basic concepts of deep mixed gas diving, recreational divers can realize how commercial divers are able to "break the rules" and dive hundreds of feet deeper than the limits they were taught. They should also realize that this isn't a technique appropriate for recreational diving.

For more information read **Mixed Gas Diving** by Tom Mount and Bret Gilliam, from Watersport Publishing, Inc. 

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photo by Tom Campbell

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An End to the Arms Race

by Chris Newbert

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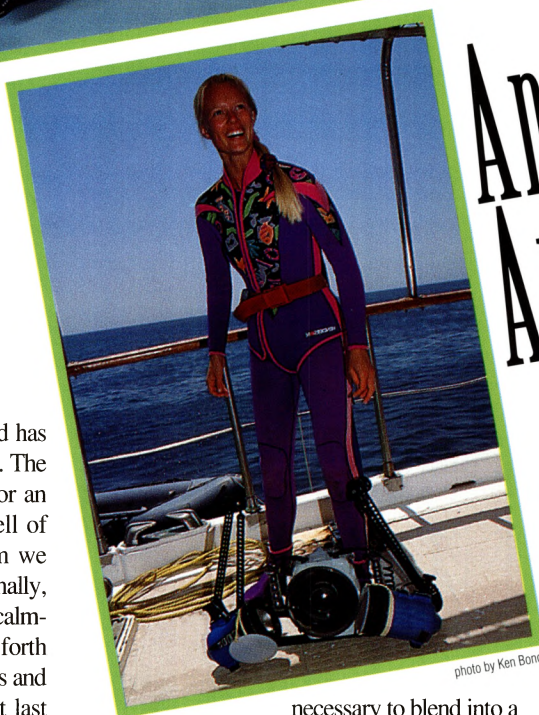


photo by Ken Bondy

necessary to blend into a single unit the camera and strobes, carrying around our studio lighting set-up in one transportable module.

Enter Tom Campbell: A former California Highway Patrolman turned world class underwater photographer, Tom no doubt felt the same frustrations many of us have with the available offerings that more often hindered us rather than helped us. But unlike the rest of us, rather than continuing to curse at existing equipment any longer, Tom actually did something about it. Tom built a better mouse trap. TLC was born and now the underwater photographic world is beating a path to his door. And with good reason.

The TLC strobe arm system can trace its ancestry to the original Oceanic arms designed by Bob Hollis over 20 years ago. Though not perfect, these Oceanic arms were

decent, and certainly the best available in their day. While not pretty, they functioned better than anything else on the market. Until now. My commitment to my old faithful arms lasted until about 20 nano seconds after first seeing the TLC system at DEMA '92. I knew at once that Tom had done it: The arms race was over.

They are striking to look at. One might think they came out of a NASA laboratory, destined to be placed in an orbiting space station. The arms are very light, owing to the many holes and grooves drilled and machined along the length of each arm segment. Each segment is formed from a single piece of solid, high grade aircraft aluminum, meeting military specifications for salt water use. As the ball joints and/or base mounting brackets at either end of the arm segment are formed from the same continuous piece of aluminum, they are unbreakable. Better yet, this single piece construction completely eliminates the dreaded "wobble" which occurs in other arms featuring multi-part construction. This unwanted wobble can make it difficult and sometimes impossible to precisely aim strobes or video lights in critical situations.

Each component in the system is hard anodized in black and impregnated with Teflon, forming an extremely durable, scratch resistant finish. Coupled with the hi-tech appearance and advanced machining, these are being referred to as the "stealth arms". Every "ball" end of each arm is individually polished, contributing, along with the Teflon anodization, to the silky smooth movement of the arms and joints and the firm locking ability. The adjustment wheels on each side clamp are large and easy to grip, allowing the photographer precise fine tuning of the holding tension for each joint. More significantly, Tom has given a new twist to the side clamp mechanism, assuring superior durability to the all important joint assembly. Earlier designs by other manufacturers utilized two pads which would pressure the ball end of each arm segment between them. Increasing tension was gained by turning a machine screw by means of a knob. This machine screw passed through the first pad and into to opposite pad, which was threaded. These two pads would effectively sandwich the balls between them. As typical pads are only about 1/4" thick, this only

allowed a few threads on the back pad, and these threads were notorious for stripping when excessive torque was applied to the knob. Using the same basic concept, Tom has run the machine screw from the back pad towards the clamp knob. The machine screw penetrates the knob instead, as it is the hub of the knob which is threaded. This triples the amount of thread, making the TLC joint assembles virtually strip proof, allowing them to be tightened as much as necessary for the roughest conditions or the strongest currents, without fear of ripping through the delicate threads of other designs. TLC arms are not revolutionary, they are evolutionary.

While bullet proof construction and precision design make TLC arms function like no others, it is the versatility of this modular system which make them "work" better for the photographer. This is where Tom's expertise as a professional photographer has reaped large dividends for us all. He has designed a totally modular system typically comprised of two-segment arm or three-segment arm assemblies. However, the arms can be completely customized, linking as many segments as one wishes. Regardless,

all arm assemblies will have an upper and a lower segment. Increasing flexibility and length can be gained by adding "double ball" segments in between the upper and lower. The upper arm can attach to any popular strobe, including Nikonos, Oceanic, Ikelite, MCD, Sea and Sea, SR 2000, and Sub Sea, as well as a wide variety of popular underwater video lights. The lower arm segments come in either of two configurations: one version has a 45° male dovetail shoe on the bottom, designed to slide into any of a number of different TLC mounting trays designed for Nikonos cameras (including the new RS) or Aquatica, Ikelite, Stromm, Sub Al (Austria) and other popular housings. This configuration provides the photographer with a fixed 45° angle on the lower arm section, with a movable upper arm section(s). The alternative lower section is merely a short vertical "base ball", providing a moveable joint at the very base of the arm assembly. Both options also fit an optional female dovetail mounting shoe which can be attached to a custom strobe mounting bar, housing body or handle or anywhere else the photographer wishes.

For three-segment arm assemblies, one simply chooses a TLC "double ball" arm segment which connects the upper arm to the lower arm or base ball. The advantage of this configuration is that the photographer gains superior flexibility in the positioning of the strobes. Every joint utilizes the same superb TLC side clamp. Both the upper segments, double ball segments and lower arm segments come in your choice of 4", 8", 11", 15", and 20" standard lengths (plus the base ball as a lower arm segment option). In addition, there is a special 4" "Macro Stern" upper arm segment designed for small, light-weight strobe heads. The number of combinations possible, by mixing and matching arm lengths are an astonishing 216 combinations! But you need not be intimidated by this. I'll make life easy for you: Get the three-segment arms. I strongly favor the base ball, or 4" angled base segment. Anything longer on the base I feel gets in the way. For wide angle work I recommend 15" middle and 15" upper arm segments. For macro work 8" or 11" middle and upper segments work fine. I have found that equal length segments work best for the middle and upper segments, but this is a matter of personal taste. The point is, if you have any special applica-



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tions or any individual quirks in this regard, you can put it together with this system.

Their mounting trays are great. They even have dovetail fittings on both the top side and bottom side of the tray. What for, you say? Well, if you are doing vertical shots using two strobes, you can simply move one strobe arm to the other end of the bar and mount it opposite the other strobe, achieving a nice symmetrical lighting arrangement, rather than the contortions normally associated with vertical shots. It is also handy for unusual lighting situations such as over/under photography with a strobe fill underwater.


I realize that I am probably sounding like a paid shill for TLC with all this praise. Surely I must have some criticisms of the system. O.K., it's a bit of a stretch admittedly, but here are the only two things that I would like to see improved: I wish the knobs that attach my Oceanic strobes to the arms had longer shafts, providing a bit more clearance between the knob and the arm when I tighten the strobes in place. Also, I have found that the allen set screws securing the base balls to the mounting trays tend to work loose after a week or so of hard use, and need to be re-tightened from time to time. And that's it. That's all I could come up with in my attempt at balanced reporting. It's a meager serving to be sure, but Tom has left precious little to fault. And the truth is, I've now learned that improvements to both these slight inconveniences have already been made. I should have known.

Lighting is arguably the most important and difficult aspect to master of any underwater photograph. Accurate positioning of the lights is the absolute essence of good lighting. Strobe arms, long ignored by equipment designers, are a key factor in the overall

lighting formula. Tom Campbell's TLC system has now given both professionals and amateurs alike the world's finest strobe arm system. No, they are not cheap, yet they represent outstanding value. We're talking top quality in materials and craftsmanship.

They are selling like hot cakes, as they should and Tom is raking in the dough, which he deserves. I'm told Tom spends

most of his time now either counting his money or polishing his Rolls. This comes as great news to this photographic competitors of course. For while the rest of us have been reduced to merely writing articles in praise of Tom and TLC, at least our photography will be easier and better as a result of Tom's uncompromising pursuit of excellence.

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There is a fundamental difference between good camera technique and bad camera technique. Good camera technique draws you into the story, giving you a view of the world the way you'd see it with your own eyes. The camera tells the story by being invisible, by letting the subject matter grab your attention.

Bad camera technique detracts from the story and makes you aware that the story is being told with a camera. The viewer's attention should be devoted to the story, not the camera. Anything that draws the viewer's attention away from the story is an unwanted distraction. However, there is a bit of a catch in the fact that in the end we do want the viewers to feel that they were treated to some very good camera work.

Avoid Too Much Camera Movement

The number one rule for getting good video results is: Hold the camera steady. A steady image is much easier to watch than a shaky or unsteady image. Unsteady images give us that "seasick" feeling, and draw our attention away from the story. Steady images allow us to focus on the scene we are watching.

On land, we often use a tripod or brace our camera against solid objects whenever possible in order to steady it. Underwater the pros sometimes use a tripod, but as a rule the shooter hand-holds the camera system. The following tips will help you keep your frame steady when you shoot.

Obtain a stable body position. Kneeling on sand is probably the best position from

which to shoot. Standing is good, but for most of us it is harder to stand than to kneel. Some divers find it hardest to shoot when they are trying to suspend themselves in mid-water while remaining neutral. It's easier to shoot while swimming, since you can control your body movement. But in any case, mastering buoyancy skills is very important.

If using a video system underwater is a new experience, it is probably best for you to settle and brace yourself. Doing so will help you hold your camera steady. However, we also ask you to do your best to stay off the coral and the living reef no matter what position you're shooting from. Divers' fins can do a lot of damage to reef communities either by direct contact or by fanning up clouds of smothering sand. Worldwide, it's becoming more of a problem, and as a community, we

photographers need to become more aware of our impact on the marine environment.

Grip the camera gently. If you clinch your fists, odds are that your camera will shake. A gentle grip will help you keep a steady frame. If you grip the camera gently, the surrounding water will act like a shock absorber.

When swimming, try to hold the camera with both hands. While kneeling, standing, or neutral, you sometimes need to use one hand to maintain your position or to turn. In any case, relax and let the water work for you. If your housing is too heavy, too light, or unbalanced, add buoyancy or weight as needed to make it easier to hold level underwater.

Keep Things Simple

It's amazing how a new video camera will make an ordinary person think that he or she is the new Steven Spielberg. New videographers are overwhelmed by the urge to zoom, pan and tilt, and to use all the fade-out, superimpose, digital picture tricks that the camera is capable of. Overuse of these features and techniques is brutal, but it's a problem defining the term "overuse." With many of these features any use is overuse, and overuse causes the viewer to become distracted as he or she thinks about camera techniques, not the story.

To Zoom or Not to Zoom

The logical question is, "if any use is overuse, why do the systems have these features?" The answer is tricky in some cases, and very logical in others. For example, let's examine the use of a zoom lens. The basic rule is don't zoom a lens when the camera is recording. Understanding the importance of the phrase, "when the camera is recording" is the key to why manufacturers make zoom lenses. A zoom lens is designed to let you change the focal length of the lens in order to get wide shots, medium shots, and close ups. Use it like you would the zoom lens on a still



Situations with big, fast moving animals can prove tricky. As the animals spread out, there is a tendency to swing the camera madly from one to the next. But if you do, odds are your composition will be weak. Try to anticipate the way the animals are going to go, and pick one that you are going to stay on as you roll tape.

by Ron Hyatt and Marty Snyderman

camera: zoom out or in to compose your frame properly, and then begin to record your sequence. A zoom lens allows you to take a wide-angle, normal, and telephoto lens with you at the same time. Your zoom lens wasn't developed to take your viewers on a roller coaster ride.

However, to be completely honest, there are times when zooming is appropriate. One very effective technique is to focus in on a small part of the overall picture and then zoom to a wider shot to reveal the rest of the picture. For example, you start with a close up of an octopus' eyes and siphon, then pull out a little to reveal the hole he lives in and the empty shells around the entrance.

So, yes, there are times when zooming works, but try to keep it to a minimum. And keep the actual amount of zoom movement

as small as possible. Go from medium to close up, or from wide to medium. Don't go from full wide to full telephoto or vice versa; it takes too long and it's distracting. Watch TV or a movie sometime and notice how very little zooming is used.

The truly important point to remember is that you will get far better results underwater if you keep you lens set at wide angle and you physically get close to your subjects. Trying to shoot at telephoto is hard for two reasons: you can't hold steady and you allow too many water particles between your lens and your subject to get sharp, colorful images.

It's the difference between home movies and good video. Amateurs zoom, professionals get closer. Learn to zoom with your legs, not with your lens. As you approach a scene, get a wide shot. Then pick out other, closer-angle shots that reveal more about the scene and the story you're telling.

Panning

Another guideline to keep in mind is don't pan or tilt too much, either. The word "pan" comes from the word "panorama". "Panning" means to swing the camera in a wide arc from side to side in order to show large parts of the scenery. Tilting refers to the up and down movement of the camera.

Big, wide pans are used on movie screens to show the vastness of open land, like in westerns, but once the thought is established, the panning stops. In a typical underwater sequence, you might find it useful to tilt from a dive boat to the divers on the bottom below. You might pan slowly from the activity near the ladder, divers entering or exiting, and tilt to the scene below where other divers are watching an octopus. Once you have established the scene on the bottom, it would probably be best to stop panning and tilting, and to cut to a tighter shot.

Short, quick pans are also useful at times to make connections between parts of an underwater scene. To use our octopus

example, you might pan from the animal peeking from his hole to the diver's face watching him, or from the diver's face to the animal. In either case the diver should be close to the hole so that you don't have to move the camera very much, and you should only pan the camera once. Continual back and forth panning or up and down tilting is distracting and unnecessary.

Lighting

Be aware of the position of the sun and the position of your subject. Since the sun is your primary source of light, it will help you to learn to use the sun's position to your advantage. Unless you are shooting a silhouette, the vast majority of the time you will want to have the sun to your back. If the sun is behind you, your subject will be front-lit, a positioning which will give you your best video results.

In the world of film, the same positioning is usually recommended, but in many instances it is not as critical. The problem in the video realm is that most divers set the

exposure to automatic iris. In this mode, your camera exposes for the brightest light. More darkly lit objects tend to get silhouetted. If the sun is behind your subject, your system tends to adjust the exposure for the sun or the bright water behind your subject. The water gets properly exposed, but your foreground subject becomes a silhouette.

Remember, you're looking for lighting situations that the camera handles well, and as a rule, it doesn't handle high contrast very well. Whenever the sun or an underwater light or the bright water surface is in the background, it means that most other things in the picture will be too dark.

If on the other hand, the sun is to your back your system has a much better chance by design to properly expose a subject that is in front of you.

Shoot at level or downward angles. This is different from still photography, where you shoot primarily upward angles to add depth to the frame and to get the water's surface in the background.

If you try to shoot upward with video,

the camera exposes for the bright background and closes the iris down, making the foreground, and anything in it, dark. When you level out or shoot down, the background light level drops, the iris opens, and foreground subjects are exposed properly.

You can shoot upwards in still photography, though, because you use strobe flashes that emit a tremendous amount of light for the instant that the camera's shutter is open. Video lights, or movie lights, are not even close to as powerful in terms of light output as are the strobes used in still photography.

The use of powerful video lights will help, of course, but even the strongest lights are no match for the sun. Strobe lights for still cameras have only to light up the scene for a fraction of a second; video lights must burn continuously. This requires massive amounts of electrical power. Typical lights for underwater video are small, battery-powered, with limited range and short burn times. They are useful for adding light and color to subjects that are close to the camera. At night, of course, they are your primary light source.

Layering and Movement

Layer your shots. The prettiest scenic shots include "layers" made up of the foreground, the middle ground, and the background. These pictures have "depth" to them, a 3-D quality that is pleasing to the eye. For instance, if you shoot straight down on a stingray in the sand, there is no background, there is only foreground. If you shoot level, it's possible to have three layers in the frame: a fish in the foreground, a diver in the middle ground behind the fish, and a kelp forest in the background.

Sometimes you can't have more than one layer, but in general, two layers are better than one, and three is better still.

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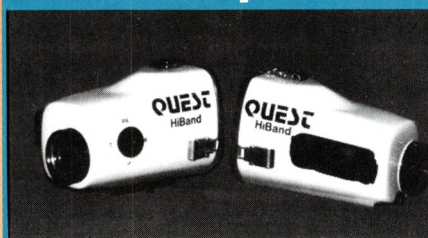
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Avoid "firehose photography." It's fine to move the camera around to follow an animal's movements. A diving, swooping, twisting sea lion makes for a beautiful subject and its sinuous movement comes across on video like it never can on stills. But don't overdo it.

Pick one animal at a time and follow it. Don't succumb to the urge to practice "firehose photography", where the camera swings all over the place, on this fish, on that person, over there, back over here, up, down, in, out. It's fun to do, but you don't get much usable footage this way, and it makes people seasick to watch it.

Extra Footage

Roll tape sooner than you think you should, and keep rolling longer than you think you need to. There are several reasons to roll tape before you might think you should, and to keep rolling after the action has dissipated. First, there is a lag of a few seconds between the time you push the button and the time recording actually starts. But second, and perhaps more importantly, in editing scenes together it is often easier to work with a scene that has some kind of a lead-in.

If you need to go directly to the action in editing, you can, but if you discover that you need some kind of transition, it will not have been recorded, and you will be stuck. This pre- and post-roll shots will make it much easier for you to edit your tapes.

The best technique is usually to start with a "clean" (meaning no subject) frame, and then let your frame evolve to what looks like the perfect still photograph, a scene in which the action comes to a climax, and then let the action disintegrate to another clean frame. You should roll tape throughout this scene. Later you might want to go back and "pick-up," or re-create the medium shots and

close-ups. If you shoot in this manner, editing will be much easier.

So start recording as you anticipate the action, and once you are rolling, keep rolling for a few seconds after you think the shot is over. A good guideline is to begin rolling early and count to at least ten on any shot you think you'll want to keep.

Summary

It is ironic that in these high-tech times when we purchase camera systems that have so many seemingly advanced features, that we get our best results by keeping things simple. While there are exceptions to the guidelines we have offered, on the whole, you will get your best results if you keep your camera moves to a minimum.

Avoid too much camera movement. Hold the camera steady. Maintain a stable body position, control your buoyancy, and hold the camera gently but firmly, in both hands if possible.

Try to keep pans, tilts, and zooms to a minimum. Get close to your subjects.

In addition, you want to constantly be aware the position of the sun in relation to you and your subject. Shoot at level or downward angles to reduce the contrast ratio and to keep the camera's iris control happy. Try to layer your shots to add a two-dimensional, or even three-dimensional look by including a foreground and background when you can.

Anticipate the action and begin recording as you anticipate. If you can, begin and end your shot with a clean frame. Hold all your shots for at least ten seconds. Avoid "firehose photography" where the camera seems to swing and swoop all over the place in random fashion.

Adhering to the fundamentals will allow your viewers to keep their attention on your story line, instead of your technique.

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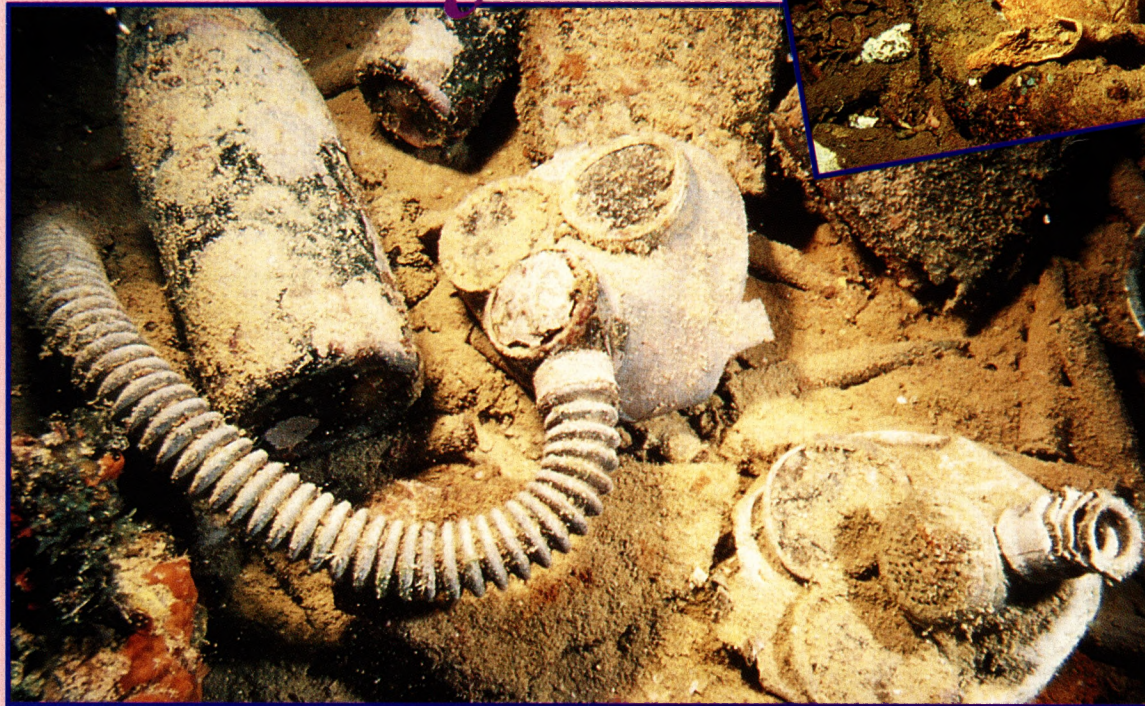
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Gardens of Graveyards



Above A few human remains are still enshrined on the wrecks.

Left Personal artifacts on the wrecks lend a human scale to the tragedy of war.

If you have a favorite wreck in your home waters, get out and dive it and experience all possible thrills and enjoyment from it before you go to Truk Lagoon. Because once you've been there, that local wreck won't seem so special any more. Truk is the major leagues of wreck diving. Not only are these ships amazingly well-preserved after nearly fifty years on the bottom, many of them have become gardens of marine life, rivaling the richest natural reefs. And underlying it all is a sense of history. During two days of brutal devastation in February 1944, U.S. aircraft sent 41 Japanese ships to the bottom of the lagoon.

When a destination has been the subject of so much hype, a potential visitor becomes wary of disappointment. Not to worry. Truk is everything you've read about, and more. Even if you aren't an ardent wreck diver, you will be enthralled by the history and the dramatic presence of these ships. And even if you become jaded by ships themselves, the marine life will continue to fascinate and amaze you.

The passage of nearly a half century has actually improved many wrecks. Conditions inside the lagoon are ideal for growth of corals and other invertebrates. Enveloping the ships is a fantastic variety of fish life, ranging from tiny fairy basslets to gray reef sharks. The deeper wrecks generally have less marine life, but dramatically convey a sense

of tragedy and the folly of war. Some superstructures and steel plates have deteriorated, but this only intensifies the aura of age and history, like the ruined temples of ancient Egypt. You can sense the spirits of the men who died there in personal artifacts like boots, binoculars, and saki cups. Although most of the ships are freighters and transports, there are also a handful of destroyers, submarines, fighter planes and bombers to explore. Whether your interest lies in penetration diving or fish watching, Truk has something for you.

Truk or Chuuk?

Truk, along with Yap, Pohnpei, and Kosrae, is a member of the Federated States of Micronesia. When the new constitution was ratified three years ago, the state revived its traditional name: Chuuk (rhymes with nuke). That means "mountain" in Chuukese. Germany owned these islands before World War I, and because their people had problems pronouncing the name, it was corrupted to Truk. Four or five generations grew up with that name and most still use it; today's children will probably be the first in 100 years to call the state by its rightful name.

Despite the gap between their standard of living and ours, Chuukese people are generally open and friendly. People stopped to give us rides

and wouldn't take payment, even for gasoline. When we rented mopeds, kids lined up along the road to give us high fives. The only reports of problems are linked to alcohol, and in those cases aggression is usually directed toward other Chuukese.

Going Down

At the outset, one prevalent misconception needs to be addressed. Lots of good diving is available without going deep. A Zero fighter plane is located at snorkeling depths; the deck of one of the most spectacular ships, the *Shinkoku Maru*, is at about 50 feet. It is possible to enjoy an entire week of live-aboard diving and seldom go deeper than 100 feet. It is true, however, that some of the well-known wrecks are located in deeper water, and decompression is necessary to explore them properly. Some dive operators will not take their customers to the deep wrecks, others make it contingent upon the diver's experience. When going deep, only two dives a day are possible, with a long surface interval between.

Diving on Truk can be experienced on a live-aboard boat or land-based. We did both, spending a week on the *Truk Aggressor* and ten days with Blue Lagoon Divers, based at the Truk Continental Hotel. Each operation has its own advantages, based on individual needs and desires.

On the *Aggressor*, you can make up to five dives a day, including night dives. They allow no one deeper than 130 feet, and decompression diving is discouraged. Although most wrecks are within a 30-minute run from Moen, a few that the *Aggressor* visits are out of range of land-based operations. This ship is everything that seasoned travelers have come to expect from a luxury live-aboard. Cabins are spacious and well-appointed, with individual showers and heads. Meals are excellent and plentiful. E-6 processing is available on board, the only reliable photo lab in the state. The ship is ideally set up for diving; a huge swim step is equipped with two fresh-water showers, and up a short staircase are the gear lockers and tank storage area. On safety stops, regulators hang at 15 feet from surface-supplied hoses for those who need them. Skipper Clay Wiseman and his crew provided the sort of low-key, friendly service that has made the *Aggressor* fleet synonymous with world-class dive boats.

Blue Lagoon Dive Shop is owned by Kimiuo Aisek, a living link with history who survived the Japanese occupation and witnessed the attack as a 17-year-old. He later became the first Trukese scuba diver, and founded the atoll's first dive operation. Although he has turned over management to his son, Gradvin, Kimiuo is still there to



Children of Chuuk

The children are at the same time Chuuk's future and its greatest dilemma. Over half the population today is under the age of 16. Eighty percent of adults live on subsistence farming and fishing; the vast majority of those employed in the money economy work for the government. The kids are friendly, exuberant, and curious as healthy kids everywhere. Through movies, videos, and watching tourists, they have been exposed to western culture, so they want the things that money can buy: cars, clothes, and electronic toys. But the money isn't there, and neither are the jobs. They represent a population time bomb set to explode when it comes time to enter the work force.

land-based operations, only four to six divers are on a wreck at once; on a live-aboard it can be up to twenty unless entry times are staggered. (The *Thorfinn* is an exception. It remains anchored as a mother ship, while divers travel to the wrecks in skiffs.)

TRUK LAGOON

Text and photography by Eric Hanauer



recall the history of the wrecks. (As a partner in the *Truk Aggressor*, he often visits that ship and tells his stories there as well.)

With Blue Lagoon you are limited to two dives a day, and the run to the wrecks is made in 24 to 30-foot boats. Because everything is inside the protected lagoon, diving is always available despite weather conditions, and rides are generally smooth. Deep and decompression diving is allowed for those who qualify, so they visit some wrecks that are not available on the *Aggressor*. With

Left The forward section of the *Aikoku Maru* was completely destroyed in the bomb blast that sank her. Here she lies among the colorful gardens of Truk Lagoon.

The local guides are excellent divers and boat handlers. Their method of finding the wrecks is impressive. The head guide just tells the skipper where to stop, and drops the hook on an exact part of the wreck as though he had a satellite navigation receiver inside his head. On deeper dives, the guides often carry an extra tank in case a customer needs it. They know how to use computers conservatively, and hang-off bottles are supplied at fifteen feet for decompression.

Truk's other land-based operation is Micronesia Aquatics. Operated by Clark and Chineina Graham, Micronesia Aquatics began operation in 1974 and is known

Seasons on Truk

January to April is the dry season, and also the high season. Visibility is best at that time, over 100 feet. During the rainy season, about 60 feet is normal. (The dry season isn't really dry, there is just less rain.) Water temperature is 83°F all year round; skins are more than sufficient. The busiest time for Japanese tourists is May, June, and December, but many of them have minimal interest in wrecks and prefer to dive the reefs. In June, July, and August many Australians come to escape their winter.

throughout the dive industry as Micronesia's leader in safe diving, environmental protection and historic preservation.

Micronesia Aquatics follows industry dive standards and their safety record is the best in Truk. They were singled out by the Pacific Daily News for their commitment to safe diving.

Chineina was the first Micronesia woman to dive Truk Lagoon, and she was recently recognized as an SSI Platinum Pro for her contributions to the dive industry.

Due to the Graham's strong record of preserving the environment and the shipwrecks, the National Endowment for Historic Preservation selected Clark to produce a video and written report documenting the shipwrecks and the problems of protecting these historic sites.

Micronesia Aquatics does not drop hooks (anchors) on the shipwrecks. Instead, a dive guide dives down and ties the dive boat off to the site. While the guides admit they do not enjoy this work, they realize how important it is to protect the ships.

Micronesia Aquatics gives every visiting diver a brochure providing information and guidelines for treating the marine environment with care and respect. It also explains the laws protecting the ships and prohibiting the removal of artifacts.

Micronesia Aquatics offers two or three day dives and night dives with more than 40 wreck sites and numerous reef locations to choose from.

Gardens and Graveyards

The 41 sunken ships in Truk Lagoon fall into two general categories: gardens and graveyards. A garden is usually a shallow wreck, decorated with soft corals and colorful invertebrate growth, with lots of fish life. They are often located in parts of the lagoon where organic matter drifts down in the form of marine snow, which can adversely affect visibility but seems to provide lots of food for the invertebrates. A graveyard is a deep wreck with monochromatic growth, that has a more somber, dramatic aspect. Some combine the best of both: lush marine life along

with guns, tanks, and personal artifacts. Which are best depends on whom you are talking to, but the five described here, in descending order from shallow to deep, are among the "must see" wrecks of Truk.

Fujikawa Maru

Depth 60' to deck, 110' to holds

It's a tossup between the *Shinkoku* and the *Fujikawa* for the most popular shallow wreck in Truk. Both share an incredible covering of marine life with spectacular arrays of war machinery and personal artifacts that lend the tragedy a human scale. On the *Fujikawa*, it is an array of Zero fighter planes in the number two hold at a depth of 80 feet. One is intact, one only a fuselage, but extra wings and propellers are stacked along the sides. The fuselage still carries a full complement of instruments in the cockpit. Everything is covered with a layer of brown silt, so it is important to stay off the bottom.

On one dive, I asked the guide to take us into the machine shop. It is located next to the engine room, but I couldn't have found the way in without help. Entering through an open skylight, we followed the stairways and catwalks down into a dark hole dominated by massive steam engines and boilers. We could still see faint blue daylight above us, but that disappeared as we turned the corner into the machine shop. Against one wall was a lathe, against the opposite a grinding wheel; a vise was mounted on a workbench, seemingly ready for the crew to come back from lunch. Around another corner was a small storeroom, with shelves of tools and spare parts. Aside from the layer of rust and silt, everything seemed neat and undisturbed, ready to be used. The depth was around 60 feet, but the darkness and the feeling of dependency on the guide made it seem much deeper. On the way out, we swam into the galley, where a huge stove was set up with pots and pans. Next door was the head, with a row of silt-covered urinals.

In the number four hold is the torpedo hole that sent her down. Steel plates have been bent inward from the force of the explosion; it is big enough to swim through comfortably. Outside, schools of jacks, barracuda, and fusiliers swam around the deck. The lifeboat davits were incredible, totally covered with soft corals. I could have spent an entire dive photographing them.

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Shinkoku Maru

Depth 70' to deck, 100' to stem

Even if there wasn't a wreck underneath, the *Shinkoku Maru's* coral garden alone makes this a magical dive. Underneath the covering of oceanic life is a 500 foot tanker.

The poopdeck is covered by anemones, so thick it looks like a ski slope. The chain locker, the base of the gun turret, and the lower decks are home to schools of glassy sweepers. These tiny, two-inch fishes formed living waves, spilling in and out of crevices as if controlled by a single intelligence.

The kingpost looks like a stanchion of the Golden Gate Bridge. An entire dive can be spent just swimming around it and observing the animals it attracts. Towering some 40 feet above the deck, it is covered with colorful sponges, soft corals, sea fans, and molluscs. Schools of baitfish hover around, occasionally under attack by marauding jacks, snappers, tuna, and rainbow runners. On these occasions, the school would split in panic, then reform after the predators went through.

Even hard-core wreck divers admit that the major attraction of the *Shinkoku* is its marine life. But the ship itself is well worth exploring. On the top level of the bridge are two intact wheelhouse telegraphs. Two levels down is the sick bay, with an operating table, surgical instruments and an autoclave. Near the stern, open skylights lead down to the engine room, a maze of catwalks surrounding steam engines built on a gargantuan scale. Guns on the bow and stern still guard the wreck.

We made four dives on the *Shinkoku*, and could easily have made a dozen more without seeing it all.

Fumitsuki

Depth 110' to deck, 130' to stem

After diving so many transports and freighters, they almost begin to blend in your mind. The *Fumitsuki* is different. A destroyer discovered by Gradvin Aisek in 1987, this sleek, narrow warship seems like a Ferrari among trucks. From the bow, its weaponry clearly defines its purpose: a fixed deck gun

surrounded by three torpedo tubes. There was lots of organic snot in the water, a key food source for rich coral growth inside the lagoon. The wrecks with the best invertebrate growth, including the *Fumitsuki*, are located in sections of the lagoon that have this snow of organic matter.

This wreck is compact enough to get a good overall perspective on one or two dives. Contrasting with the pristine condition of most of the ship, the area between the stack and the stern guns was badly damaged. Most of the bridge has collapsed, and now lies on the bottom. Major impressions are the lethal looking, heavily shielded bow and stern guns, and a tall remnant of the bridge structure. Artifacts laid out by the guides included gas masks, binoculars, and shoes.

Both propellers are still intact, the port one in the sand, the starboard up in the water column at the end of its external shaft. Its formidable size attests to the power and speed of the ship.

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The Truk Aggressor.

Aikoku Maru

Depth 130' to bridge, 170' to hold

A massive explosion engulfed nearly the entire front half of this transport ship, and destroyed the American plane that hit it as well. Looking forward from the triple-decked wheelhouse structure, the sight of the tangled wreckage is eerie, especially in the dark waters at 160 feet to the deck. On most wrecks you have to search for the damage that sunk it, on this one there is nothing left of the bow except tortured metal.

I asked to see some human remains, so Chenni, the chief guide, led us inside the stern compartment. A skull was broken into pieces, lying in a bowl of some kind. Around it were sheets of parchment with Japanese characters, and the remnants of a wreath. A number of skeletons still remain deep inside the ship, but are left undisturbed out of respect for the dead and for safety of the living. Careful not to disturb the silt, we moved into the galley where bowls, dishes, and bottles were arrayed, along with a pair of spigots that must have been attached to a beer keg.

The stern gun is frozen in a 45-degree firing position. Marine growth is a lot more sparse than on the shallower wrecks; the controls are still readily identifiable. The kingpost is a reference for finding the ascent line,

and also a photo opportunity for wide angle silhouettes and detailed closeups of the marine life on it.

San Francisco Maru

150' to deck, 170' to holds

A passenger liner/freighter, the *San Francisco Maru* is 385 feet long, and lies in nearly 200 feet of water. In contrast to the shallow wrecks, its dark, monochromatic shape seems stark and sinister, the effect perhaps accentuated by a touch of narcosis. Even with decompression, it takes several dives just to see her superficially, so the best strategy is to pick one section and explore it, then do another part on another dive.

On my first two dives I never left the bow section. Three trucks in a forward hold are surprisingly well-preserved; three tanks are located on the forward deck. They were smaller than expected, probably two-man models, but treads and guns were intact. The forward hold is filled with neatly stacked rows of mines and detonators; still lethal after a half century. The deck gun, reportedly the most spectacular in Truk, is mounted on a huge, motorized swivel.

On the deck, the engine room skylights are framed by four ventilator horns, two of them totally intact. A huge mast loomed above the bow, shaped like a cross with even the rigging overgrown with invertebrate life. A visit to the *San Francisco Maru* is exciting, not only because of its "forbidden zone" depth, but because this is a classic wartime shipwreck, both on a grand and an intimate scale.

The wrecks mentioned here are my personal favorites. Ask other Truk divers and you may get very different answers. In an informal survey, skipper Clay Wiseman of

the *Truk Aggressor* chose the *Nippo Maru*, *Sankisan Maru*, and *Hanakawa Maru*, along with the *Shinkoku* and *Fujikawa*. Gradvin Aisek selected the *San Francisco*, *Nippo*, *Hanakawa*, and *Shinkoku*. Kimiuo Aisek prefers the *Nippo* and the *Shinkoku*. Shallow or deep, there are wrecks for every level of experience.

Things To Do On Land

Most land-based divers stay at the Truk Continental Hotel, the best address on the island of Moen. The site was a wartime seaplane base, later a coconut plantation. Every room has a balcony that offers views of the palm trees, the sea, and the islands that are as much a part of the Truk experience as the shipwrecks. Most important, the hotel is large enough to house a critical mass of divers, making for interesting conversations over dinner and drinks with an international clientele. Built 23 years ago by Continental Airlines, the hotel is in the process of being sold to a private company which plans a major remodel and expansion.

On the hotel grounds is a concessionaire who rent mopeds at \$10 for four hours. This is an enjoyable, low-key way to see the island of Moen. Don't worry about traffic; speed limit on most of the island is 15 miles per hour, and drivers are generally courteous to tourists who don't know their way around. The map supplied with the rental is sufficient, but if you get lost, people are happy to show you the way.

The best view of Moen Harbor is from a cliffside cave that still houses a Japanese long-range cannon. Xavier High School, at the northwest end of the island, used to be a Japanese communications center. Heavy steel doors have been painted bright red, offsetting the imposing reinforced concrete of

Truk Lagoon continued on page 65.

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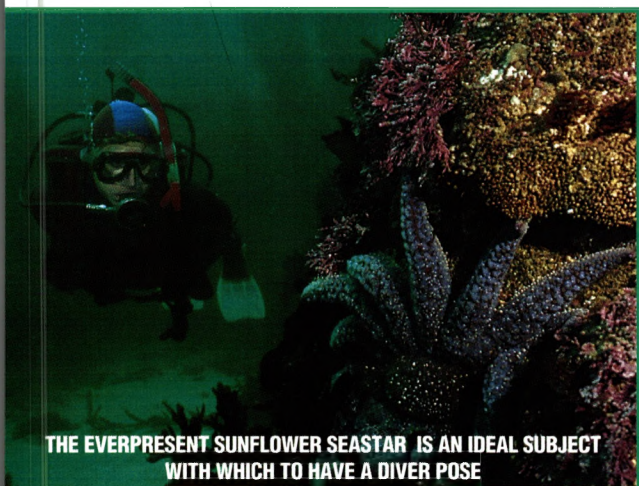
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The End of Monterey Bay

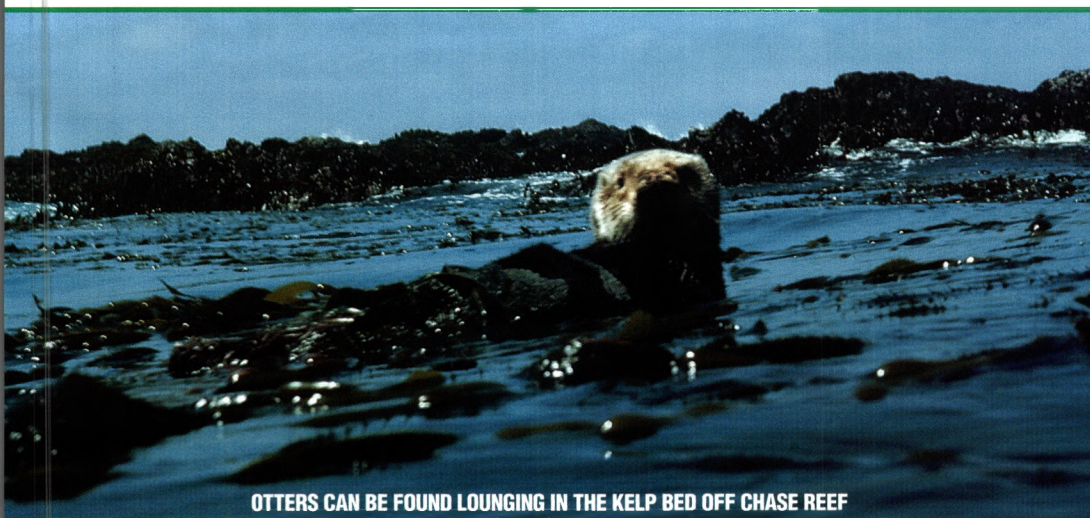
TEXT AND PHOTOGRAPHY BY GILL CRUZ



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ASCENDING THROUGH THE KELP FOREST



OTTERS CAN BE FOUND LOUNGING IN THE KELP BED OFF CHASE REEF

DIVING IN CERTAIN AREAS OF MONTEREY BAY IS AN EXPERIENCE THAT CENTRAL CALIFORNIA DIVERS WOULD LIKE TO KEEP A SECRET. THESE AREAS CAN BE DIVED DURING INCLEMENT WEATHER AS WELL AS IN THE USUAL GOOD WEATHER. MOST DIVERS SEEM TO FREQUENT SITES FROM LOVER'S POINT EAST TOWARD THE WHARFS, BUT MONTEREY BAY DIVING DOES NOT END AT LOVER'S POINT IN PACIFIC GROVE. AN IDEAL SITE, THAT IS FREQUENTLY OVERLOOKED, IS WEST OF LOVER'S POINT AND JUST NORTH OF POINT PIÑOS. THIS AREA IS KNOWN AS CHASE REEF AND IT RIVALS ANYTHING ONE CAN FIND IN THE BAY.

Photo by Ken Loyst

Chase Reef is actually comprised of two reefs, Inner Chase and Outer Chase Reefs. Inner Chase Reef has a rocky topography that is interspersed with caves, crevices and ledges that run parallel to shore at depths of 40 to 60 feet. Outer Chase Reef is characterized by rock dropoffs that descend to 100 feet plus, and an archway located at the end of one of the dropoffs. The outer reef is located north of Point Piños, and begins in the midst of the expansive kelp bed at about 300 yards from Coral Street Beach.

Typically, the site is a boat dive frequented by private and regularly-scheduled charter dive boats. However, Chase can be easily accessed with boats and inflatables launched at the Monterey wharf. The ten-plus minute ride out is barely noticeable

because of the scenic coastline and other sights that capture your attention.

Shore diving is possible, but be prepared for an endurance swim out to the dive area. The distance is more than a quarter of a mile offshore, and there is an extensive kelp bed through which you have to swim. If a beach entry is your thing, access the water at the Coral Street Beach area. Remember to use a dive float if you are kicking out; it will provide a rest platform for your return swim.

The kick out underwater can be rewarding; you can enjoy terrain covered with coralline algae and kelp, and populated with a profusion of marine life. Nudibranchs, crabs, tube anemones, seastars and many other creatures offer a wide variety of subjects to observe and photograph.

The surge at the inner reef is light to moderate with two to four foot swells. The visibility is reasonable, ranging from five to forty feet, depending on the time of year. During the summer and fall months visibility is affected by the dense kelp forest, which attenuates the light trying to penetrate the thick canopy.

Being located near the lee side of Point Piños, Chase Reef does not have strong currents. The intermediate diver can enjoy this area, but experience with diving in surge is highly recommended.

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Dive Travel Operation in Monterey:

LeGrand Travel, 211 Pearl Street, Monterey, CA 93940; (408) 372-1800, (800) 833-9992.

Dive Retailers:

Aquarius Dive Shops: 2240 Del Monte Avenue, Monterey, CA 93940; (408) 375-1993; or 32 Cannery Row, Unit #4, Coast Guard Pier, Monterey, CA 93940; (408) 375-6605.
Bamboo Reef Monterey: 614 Lighthouse Avenue, Monterey, CA 93940; (408) 372-1685.

Outer Chase Reef is an all together different experience than diving the inner reef. To begin with, the site is rated for intermediate to advanced divers. It is comprised of a series of dropoffs, and unlike that of the inner reef, the marine life differs remarkably. Metridiums carpet most of the dropoff topography. The prolific kelp forest provides a haven for kelp crabs, snails, isopods and fish. Near the kelp holdfasts, bottom-dwelling creatures like nudibranchs, decorator crabs, gobies and seastars compete for space and food. Ever-vigilant for their next meal, cabezon and the prized lingcod can be seen in the rocks and crevices. The walls formed by the dropoffs are entirely enveloped in bryozoans, anemone colonies and sponges.



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One thing that can be said about Chase Reef is that it is difficult to find a bare spot on the bottom. The entire area is blanketed in coralline algae and kelp. These attributes make for aquarium-like conditions where life can be found everywhere.

The current can be strong and the swell at the outer reef can be large (four feet plus), which results in a strong surge. When the conditions are this poor, it is advisable to move your diving nearer to the Breakwater or McAbee Beach. If you decide to remain at Chase, set the anchor of your boat securely and let out plenty of slack to compensate for the rough conditions. After a dive is completed and you are back in the boat, take time to look around the top of the kelp bed. You may be rewarded with a look at the ever-present sea otter. With patience, you can gain their confidence and approach them close enough for a photograph or just to marvel at their acrobatic antics in the kelp.

Diving at Chase Reef is often overlooked by many divers, simply because it is either too far to swim out to or the conditions are too rough. It would be a shame to miss diving this site solely for these reasons. Avail yourself of Chase Reef by using your own boat or board one of the many readily available dive charters. Chase Reef does offer better than average diving when conditions are favorable.

For more information on diving in the Monterey area, pick-up a copy of Watersport's Monterey Map at your local dive store.



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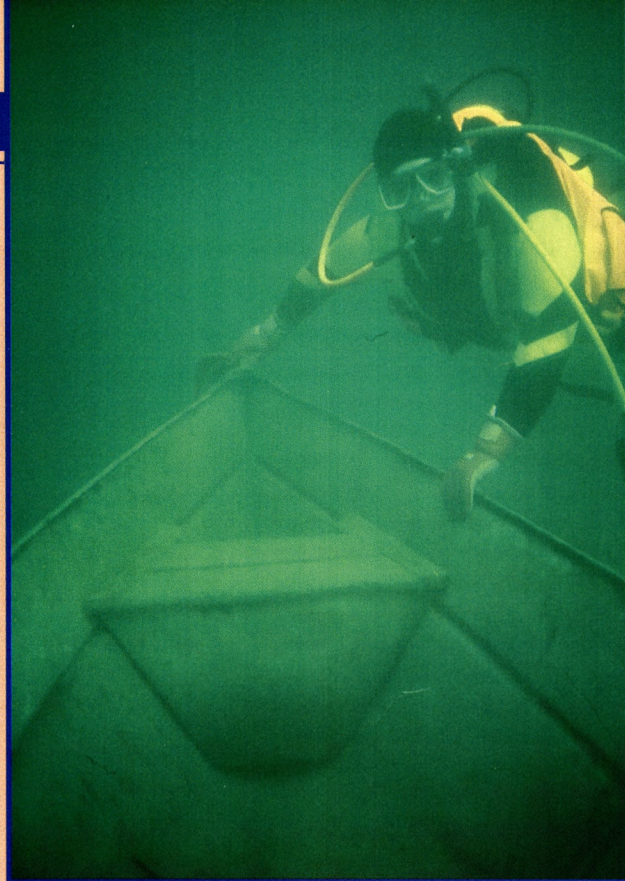
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GILBOA STONE QUARRY

TEXT AND PHOTOGRAPHY
BY RICH SYNOWIEC



Our story takes us to a little town in northern Ohio in the farming community near the town of Gilboa. Quite a few years ago, no one can tell you exactly how many, someone who had a shovel and a vision began to dig a hole and haul limestone out of the area. Nearby, the town of Gilboa became a thriving metropolis and the Ottawa Stone Quarry employed many of the people who lived in this growing community located about halfway between Findlay and Ottawa, Ohio. For many years, countless tons of limestone were pulled from the quarry and shipped all over the Midwest. Unfortunately, (or fortunately as the case may be), in 1982 the quarry had to close and the pumps that had kept the quarry dry were shut down. Over the next eight years, the quarry slowly filled with water. In 1990, a lake had formed where the quarry had once been and Dan Diller, a diver from Pandora, Ohio, purchased the quarry at a farming auction. Of the hundred or so farmers at the auction, none could see what someone would want with a big hole in the ground. But, Dan Diller knew differently — a hole filled with water had a certain appeal to many people, specifically, the divers of the Midwest area.

I met Dan one weekday afternoon when he visited the dive shop where I was working as an instructor. He struck me as a little hard

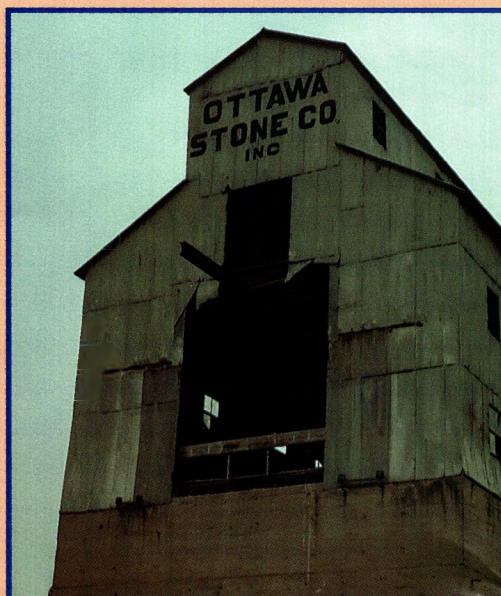
to believe when he boasted of a quarry, which he had renamed Gilboa Stone Quarry, that had over eighty feet of visibility (remember this is the Midwest), a quarry that had only been experienced by a handful of divers. A bus was sunk at the quarry by the local sheriff's department and an underwater forest that had grown up before the quarry had completely filled with water. Dan also spoke of a road that led right down into the water.

Armed with my scuba equipment and a handful of directions that were essentially go-south-then-west-and-when-you-reach-the-cow-turn-left, my buddy, Mike White, and I drove to the quarry on a cold day in November. When we arrived, Dan gave us a tour around the quarry; a tour which he still does for newcomers today. He told us of his plans for the quarry, and of all his ideas he wanted to make a reality. After the tour, Mike and I decided to dive on the deep side since he was Deep Diver certified and I was a Deep Diver Instructor. We didn't believe that the quarry was over 100 feet deep but we planned our dive to 120 feet for safety and set up our pony bottles and, just in case, an emergency decompression cylinder. To see if we could get a depth

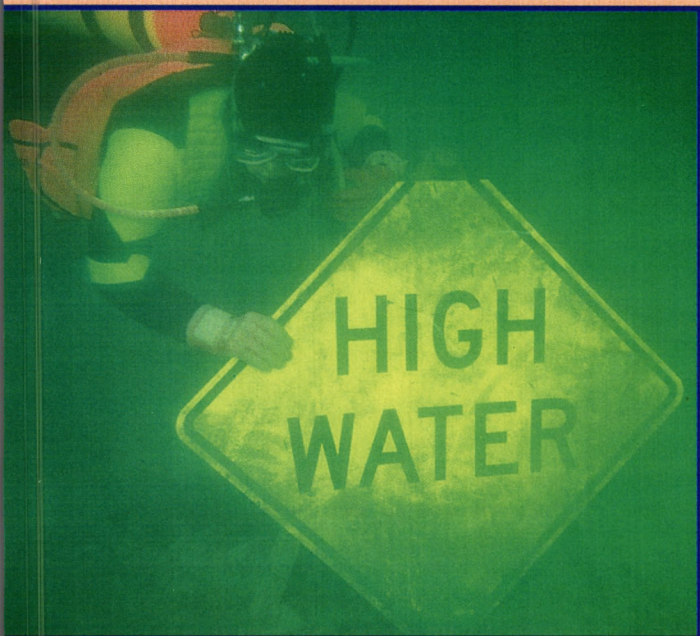
measurement, we attached a light to my wreck reel and dropped it over the edge of the wall.

At the 110 foot mark the light touched bottom. While we were pulling it up, we caught sight of it at 40 feet. Visibility was fantastic (remember again, this is the Midwest). Mike and I quickly suited up in our drysuits and entered the water. We descended next to the wall, facing each other, feeling like Bud Brigman in the movie *The Abyss*. Looking up at 70 feet, we could still see Dan looking over the edge of the wall. At 80 feet, we reached a sulfur layer. Our lights made it look as though we were floating above the clouds.

After exchanging OK's and assuring each other that we weren't cold, Mike and I



DIVING DELIGHT OF THE MIDWEST



Opposite page top Diver posing at the bow of a sunken paddleboat.

Opposite page bottom Ottawa Stone Co. mill at the quarry.

Left A diver has fun with a "High Water" sign found in the quarry.

Above Topside at Gilboa Stone Quarry.

descended through the sulfur layer. In the cloud, visibility was decreased to less than a foot, I could see the glow of Mike's light as it tried to cut through the mist. At 100 feet the cloud dissipated and we descended into darkness, our lights clearly showing the bottom 19 feet away. The visibility along the bottom under the cloud was the length of our lights, but it was very dark and no light penetrated from the surface. The water had a sulfuric taste and everything appeared blackened.

We swam along the bottom for a few yards before ascending back up above the sulfur cloud. We continued along the beautiful wall at 60 feet before ascending into the shallower portion of the quarry. In the shall-

low part we swam through the trees and around the bus and followed the road back up to where we exited. There were tons of fish and the trees were incredible. The quarry was everything Dan had said it was and much more.

Two years later, after over 60 dives in his Gilboa Stone Quarry and after watching most of Dan's ideas become reality, I am happy to share what I know about the quarry.

Gilboa Stone Quarry is a quarry for divers and snorkelers only. There is no swimming allowed without a mask, snorkel, fins and an environmental suit. The quarry is essentially divided into two parts — the south side where the depth ranges from five

to 85 feet, and the north or deep side where the depth ranges from 100 feet to 150 feet.

The south side was the last portion of the quarry to fill, so over the years a forest grew up and a vast number of trees are now completely submerged underwater. A diver can weave in and out of the trees giving the feeling of flying through the woods. (If you plan a dive here, please be careful when you are diving in the forest. If you break or damage the trees they will never grow back. Be aware of what your fins are doing. You don't want to be responsible for damaging anything.) There are also a lot of other things to see in the quarry that were placed there by Dan and other volunteers. These include a

IMPORTANT TIPS FOR COLD WATER DIVING

For most of the divers who frequent the lakes and quarries of the Midwest area, cold water diving is nothing new. But, for the typically Caribbean diver or even the Midwest summer diver, there are a few things you should be aware of and take into consideration:

1.) Make sure that your regulator has been serviced recently and has been set-up for cold water diving. Even the so called "Cold Water" regulators freeze if they are not set-up specifically for diving in cold temperatures. Ask about preventative measures that you can take at your local dive shop. If you want to dive in the colder water, be sure to ask your local dive shop staff about environmentalizing your regulators, especially the second stage. If they have never done anything like that or have problems with your particular regulator, you can call at Michigan Underwater School of Diving, at (313) 388-1323, and they will be happy to tell you what to do.

2.) Bring along warm water bottles to pre-flood your wetsuit before entering the water. This will minimize the amount of heat lost at the beginning of the dive. There are also commercially available heat packs to help you keep your wetsuit and drysuits warmer.

3.) Limit your bottom time and end the dive if you get cold. It is better to make two comfortable short dives than one long miserable one.

4.) Be sure to dry off completely after exiting the water. Don't stand around in a wetsuit or damp bathing suit. Make sure you put something warm against your skin. It will help you warm up faster.

5.) Limit your depth. Remember, the deeper you go, the thinner your wetsuit becomes and the colder you will be.

6.) And finally, *ask questions*. If you want to know more about how to dive in cold water. Ask the professionals at your local dive store.

cabin cruiser lying on its side, a VW Bus, a school bus complete with seats and tires filled with air, a few small boats, the remains of a dynamite shack, and a set of four 30-foot tubes stacked on top of each other to make an underwater maze for cavern and wreck divers. Dan has stocked the quarry with rain-

bow trout, walleye, bass, bluegill, and it even has eighteen paddle fish. For instructors, Dan has placed in the quarry five platforms for certifications with plans for five more around the shallow end. The platforms currently in the quarry are located near the

points of interest for easier underwater tours during training dives.

The deeper side of the quarry has dramatic wall and limestone formations. Divers from Michigan Underwater School of Diving and Scuba Rich Unlimited placed a multi-level ladder there to assist in Advanced Open Water Diver Training, Deep Diver Training, and Multi-level Diver Training. The ladder has rungs down every twenty feet to a depth of 100 feet. Dan asks divers to limit their maximum depth to eighty feet in the interest of safety. Divers need to be reminded that this isn't Grand Cayman or Cozumel and eighty feet of fresh water can seem a lot deeper and a lot colder, not to mention the ever-present thermoclines. Even if you are Deep Diver certified, if you received your certification in warm clear water, you should think twice about going deep in freshwater without, at the very least, an environmental orientation dive (see insert regarding cold water diving tips). If you call ahead to the quarry, Dan can arrange an instructor to give you an environmental orientation dive or another cold water class. They may also be able to tell you when someone else will be down who can teach you a course.

Gilboa Stone Quarry currently has five entrances, one on the deep side and four over on the south side. The other entrances are essentially floating docks with stairways leading into the water. At almost every dive site there are tables to set your equipment on when you are suiting up. At the deep side entrance/exit there is a hang bar set at fifteen feet to help you with your buoyancy when you are doing your after dive safety stops.

Top side, the quarry has a lot of great features too. Long Lake Scuba of Lima, Ohio, set up a mini dive shop for rentals, repairs and last minute items. There are heated changing rooms on those colder days, outdoor showers in the summer time, rest rooms, a patio for lunch, and some of the best burgers in Ohio are available at the concession stand. There are several primitive campsites available with picnic tables and fire pits. For those people who prefer to do their weekend camping in a hotel, Dan has made arrangements for diver discounts at local hotels and motels in the area. When you get to the quarry you can ask the staff about such offers. As an aside, the towns of Gilboa and Ottawa offer a little bit of country charm to



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Getting There

To get to the quarry from anywhere in Ohio and Michigan, you can follow I - 75 until you reach exit 159 in Ohio. Exit 159 will put you on highway 224 which you want to follow west. Follow 224 west for about 13 miles and look for the Frogtown Elevator (silos) and the statue of a large cow. At the cow turn left on Pearl Street. Follow Pearl Street south to the Main Street stop sign. Turn right at the stop sign and follow Main Street through Gilboa about a mile until you reach the Quarry Entrance. If you get lost call the number below. The quarry is open all year around although there are limited hours in the winter time. The hours during the summer time are Friday through Sunday, 9 a.m. to 9 p.m. Later this summer the quarry will be open on Wednesday and Thursday also. For more information, you can call the quarry at (419) 456 3300.

the area. There are sites to see like the Ottawa fairgrounds, the old Frogtown elevators, the mysterious leaning barn and a local favorite among the tavern goers, Stinky's Country Well.

When you get to the quarry you will need to sign in and leave your certification card at the front desk. There is a list of regulations and quarry rules you will need to sign. Be sure to pick up a map of all of the different dive sites in the quarry. The map includes compass courses from the various entrances to the sites, most of which are buoyed. The cost of a day of diving at the quarry is six dollars. The campsites and air fills are extra.

As far as things to bring with you when you travel to the quarry, you should bring your total diving system including a 1/4 inch wetsuit or a drysuit. You must wear a BC and have an alternate air source. You should also include a cold water hood and cold water gloves in your gear bag. Although some people opt not to wear hoods or gloves on the shallow side during the months of July and August, they are still highly recommended for your own comfort and safety. On the deeper side temperatures drop considerably due to upwellings from below the thermoclines. Water temperatures there tend to range from 38° to 55° Fahrenheit. If you have never dived in cold water, avoid diving deeper than forty feet. Remember, past 40 feet your wetsuits are a lot thinner than normal and your regulators are more prone to freeze-ups and free flows.

Since Gilboa Stone Quarry is a divers-only quarry, no dive flags are needed. There is air available at the site so you only need to bring one or two cylinders, but if

you are planning a deeper dive, a hang tank and a pony bottle are always a good idea. If you are an instructor with a class, you get your air fills free.

Gilboa Stone Quarry is a wonderful place to dive in, learn in, and teach in. There are tons of things to do and see and

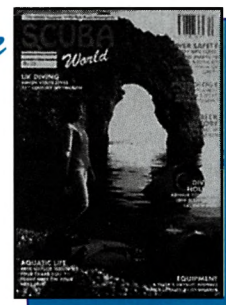
with the exceptional visibility you won't miss much. Hope to see you there.

Rich Synowiec, the founder of Scuba Rich Unlimited, is an avid diver with over 400 dives in the Midwest Area including over 60 dives in Gilboa Quarry. He is a PADI Master Scuba Diver Trainer and is certified in 13 different specialty areas and Medic First Aid.



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SERENDIPITY & THE ART OF

Webster defines serendipity as: "An aptitude for making accidental fortunate discoveries." Without getting overly sentimental, serendipity seems to best describe my re-occurring wonderful experiences since venturing underwater with a camera some ten years ago.

It was serendipity when a friend coerced me into attending an undersea slide show by a local photographer, which forever changed my life. Disgusted by spearfishing and bored by years spent assisting various scuba instruction classes, the magic in my diving had nearly vanished. Mesmerized in my seat at the slide show by graphic underwater images projected larger than life; my ambitions, goals and lifelong dreams were suddenly planted in the seeds of a photographic obsession.

Before purchasing a Subsea camera, I combed every friend's collection of dive magazines to glean photographic information. For almost a year I studied every book, article and brochure on anything to do with underwater photography while waiting for the particular camera model and lens to appear in used equipment ads. One month before my first tropical diving vacation, my hands were finally caressing the semi-wide 28 millimeter optic on my mint Nikonos 3 and Subsea 100 watt strobe.

My wife's early attitude of ambivalence to my compulsive behavior turned to dismay when entire weekends disappeared in the pursuit of new images and new lines to replace, "It's just a quick local dive honey, I'll be back in a few hours."

The transformation was further fueled by winning several local and national underwater photo contests only months after my first subsea camera.

Now, tens of thousands of slides later, I am making a full-time living in stock photography. Starting with a reputable stock photo agency eight years ago, I quickly realized that underwater photography would always be my specialty, however, to earn a living would require an equally obsessive pursuit in others areas of interest such as adventure and

willing to learn manual strobe exposure or experiment with slave strobes, spot-light effects, or backlighting; all counterproductive to basic TTL (through-the-lens) exposures.

My advice to all budding underwater photographers has been to first become an expert diver. With proper training, scuba diving is a very safe sport. Yet, photographers in

particular often face perilous circumstances in the excitement of filming unique underwater subjects. For example, a photographer concentrating on capturing a moving subject such as a jellyfish in shallow water with an eye glued to a housed camera, will naturally hold his breath. Not only a dangerous habit, but an open invitation to a massive air embolism.

One must be at complete ease with bulky drysuits, hip-bruising heavy weight belts and endure year-round temperatures deviating little from 45° F, in the pursuit of Pacific Northwest subjects. Many certified divers in the Northwest spend their underwater time in

warm water destinations only. These people miss a wonderful opportunity to see spectacular backyard subjects, such as the giant Pacific octopus, eight-foot long wolf eels that feed on sea urchins with puppy-dog affection, or the antics and ballet of graceful sea lions to name but a few.

Underwater with a camera I often have the feeling that there is nothing in the world I would rather be doing and no other place I would rather be. Capturing a unique image allows me to forever relive the original experience as well as impart it to others.

The countless forays into the northern wilderness of British Columbia have produced most of my favorite and best-selling



SPACESHIP ANEMONE

Spaceship Anemone Nikonos 3 with 28 mm lens plus Hydrophoto close-up attachment. Subsea Mk 100 strobe: 1/60, F11 at Full Power on Kodachrome 64 Film. Photographed at Barkely Sound, Vancouver Island, B.C.

travel photography. The advantage of working closely with a local agency has proven to be invaluable for guidance and direction on local and exotic travel excursions.

During four consecutive years of teaching underwater photography workshops at the Seattle Aquarium Film Festival, I have viewed the portfolios and favorite slides of many aspiring photographers. In many of the images, I see a recurring failure to grasp the understanding of basic lighting techniques. Today's big-buck ad campaigns of totally automatic functioning underwater cameras allow anyone the immediate enjoyment of well-exposed images on almost any underwater outing. However, few people seem

COLD WATER PHOTOGRAPHY

Text and photography by F. Stuart Westmorland

images. In many of them, capturing the decisive moment on film was directly attributed to serendipity. However, it is only fair to mention that spending studious hours studying marine life behaviors, knowledge of the habitat, and seemingly endless maintenance of underwater gear will greatly increase the odds of not just experiencing serendipity but also recording it faithfully on film.

Spaceship Anemone

I was surprised and elated after finding this frame in the yellow film box, only my fourth roll of film exposed through any 35mm camera.

I hand-held a single strobe directly above a large fish-eating sea anemone that appears to be floating in space. The graphic color and tentacle posture have yet to be matched in the hundreds of sea anemone frames that followed this one.



PRECARIOUSLY PERCHED

Precariously Perched

The phrase "precariously perched" really applied more to me than the acrobatic hermit crab pictured here. Turret Rock is a tiny island smack dab in the middle of a narrow ocean channel in Northern B.C. called Nakwakto Rapids. Located 200 miles north of Canada's cosmopolitan city of Vancouver, the awesome tidal currents of Nakwakto Rapids have been known to exceed 20 knots and are considered the fastest of any navigable waterway in the world.

The goose barnacles (*Mitella polymerus*) until very recently had never been observed subtidally. Long considered an intertidal species found exclusively between high and low tide marks on rocky, exposed Pacific coastlines. Completely baffling biologists, these beautiful barnacles are flourishing in giant clumps at Turret Rock at depths well past 60 feet. Apparently the high velocity currents and whirlpools of Nakwakto tidal flows oxygenate and carry the necessary nutrients to feed *Mitella polymerus*. The "slack time" interval between flooding and ebbing is almost non-existent here. Attempting to focus an SLR camera in a bulky housing in high current conditions is nearly impossible. Working in near darkness at a depth of 70 feet I struggled to hold my Aquatica housing steady as an increasing rush of water threatened to upend my mask. How on earth that tiny hermit crab balanced on an actively feeding, slick-sur faced barnacle shell is still a mystery to me.

Double Vision

Certain my eyes were playing tricks on me, it was only after several exposures that I stopped slapping my cold-numbed head in an apparent attempt to straighten my vision.

Precariously Perched Canon F-1N with 50 macro lens in an Aquatica housing. One Ikelite 150 strobe set to 1/2 power. 1/60, F16 and KR 64 film.



DOUBLE VISION

Double Vision Canon F-1N with 28mm lens in an Aquatica housing. One Oceanic 2001 strobe, 1/60 at F11 and Fuji 50 film.

The incredible diversity of soft corals, anemones, hydroids and sponges of Queen Charlotte Strait are almost too overwhelming to comprehend with a camera in hand. Drifting along the current-swept walls I always feel like a painter scanning a huge colorful palette for hidden surprises.

The red Irish lord is a voracious feeder of smaller fishes that come too close. Their mottled color patterns blend perfectly to the colorful substrate, a characteristic shared by another sculpin much further south – the stonefish. These two sculpins were actively engaged in some kind of behavior and seemed completely oblivious to my pulsing strobe light and bulging eyes from trying to focus, and maintain buoyancy on a sheer vertical wall.



DARLING DOLPHINS

Darling Dolphins Canon F-IN with 20mm in Aquatica housing. Two Ikelite 150 strobes at 1/4 power, 1/60 at f/5.6 and Fujichrome 100 film.

Darling Dolphins

Some of my lifetime memorable undersea moments were shared in the midst of dozens of Pacific white-sided dolphins. Queen Charlotte Strait near Port Hardy, British Columbia has a summer dolphin population in the hundreds. In my underwater encounter I was extremely fortunate that the dolphins tolerated both my regulator exhaust bubbles and my two wide-angle strobes.

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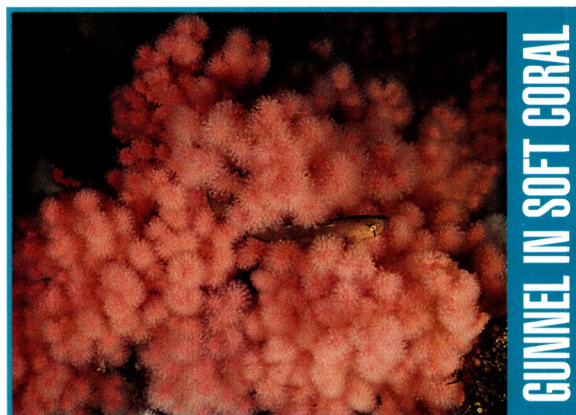
Heavenly Reflections

One of the real treats often overlooked by divers enjoying British Columbia's undersea wilderness are these heavenly reflections. Sitka spruce trees with moss-entwined branches often extend over the water's edge above the high tide zone throughout northern British Columbia. The cold clear water, streaming sun and surface sky/tree reflections combine to create abstract, other-worldly views. Capturing these ethereal views on film is anything but easy. Aiming a portly housed camera directly overhead, arms length from spiny sea urchins is the easy part. Just imagine, at the same time, holding your breath in a tight-fitted dry suit for a full minute. This allows all the regulator exhaust bubbles to dissipate on the sur-



HEAVENLY REFLECTIONS

Heavenly Reflections Canon F-IN with 20mm in Aquatica housing. One Ikelite 150 Strobe at 1/4 power, 1/60 at f/5.6 and Fuji 50 film.



GUNNEL IN SOFT CORAL

Gunnel In Soft Coral Canon F-IN with 28mm in Aquatica housing. One Ikelite 150 Strobe at 1/2 power, 1/60 at f/8 and Fuji 50 film.

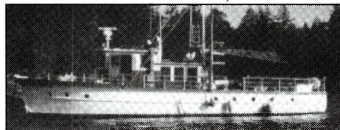
face for a bubble-free wide angle view, and is repeated for each exposure.

Gunnel In Soft Coral

The soft coral proliferating the high-current areas of Northern British Columbia make a colorful subject all in themselves. Imagine my surprise when a lovely golden gunnel appeared entwined among the cotton-like pink tufts of soft coral for a few precious exposures.

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Truk Lagoon continued from page 54.

the main buildings. But the highlights of the moped ride are glimpses into Trukese life, especially along the dirt roads of the countryside.

Eten Island is where Blue Lagoon brings divers for lunch and outgassing breaks. Unlike the high school which escaped heavy damage, the command posts on this island were bombed extensively. Roofs are collapsed, with rebar skeletons protruding through smashed concrete. Even the iron doors have holes melted through them from incendiary bombs.

If possible, try to arrange a tour of Dublon Island. In contrast to Moen, Dublon retains a rural flavor, with no paved roads and the residents still in close touch with the land and the sea. Japanese military installations include a communications center carved into a mountain, a partially melted gas tank that burned for two weeks after the bombing, and an abandoned hospital that is slowly becoming consumed by the jungle.

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Daily air service to Truk is offered by Continental Air Micronesia, either through its hub in Guam or direct from Honolulu on the Island Hopper. Many divers combine a trip to Truk with other Micronesia destinations, including Palau or Yap or Pohnpei. This is fine, but don't try to do too much on

one trip. Each place is worth savoring and exploring in detail. A rushed itinerary (if it's Friday it must be Rota) results in a superficial perspective that misses a lot. Time and budget permitting, Truk is worth ten days to two weeks, split between a live-aboard and a land-based operation. I was there three weeks, and didn't get enough.

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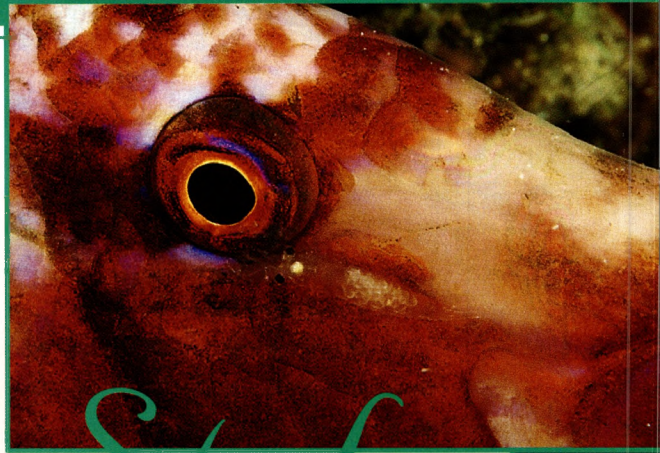
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Night Diving Hawaiian Style

Text and photography by David Fleetham



What do the animals that make cowry shells look like? Do octopus swim, crawl, walk, or what? What in Hawaii produces a bright red, rose shaped, jelly-like, egg mass on rocks? How do photographers get the close, detailed photos of parrotfish?

All of these questions, and many more, can be answered by diving in Hawaii at night. For many, the thought of swimming around the reefs of these volcanic peaks in the middle of the Pacific, in the dark no less, is not entirely attractive. Relax though. Everything that is there at night, is there during the day. The difference is that much of what lives on the reefs is hidden from view during the sunlit hours, but right after sunset, when the bartenders are pouring mai-tai's at happy hour prices, the reef begins a transformation. Sometimes this transformation will convert what was a mediocre dive during the day, into a dive that will leave you wishing for one of those new high volume cylinders.

Many of the creatures which are easily passed over during the day are remarkably obvious at night. The reason for this is twofold. First, because your attention is compressed into only the area of the reef you can illuminate with your light, your whole outlook changes. You no longer rubber neck around 360°. Ten minutes go by while you watch coral polyps feeding.

Second, everything you look at is illuminated to show its true colors, unaffected by the filtered ultraviolet of the sun. Red is red, yellow is yellow, purple is purple. Creatures that blended into their surroundings earlier in the day now stand out like a cat in an aquarium. Titan scorpionfish (*Scorpaenopsis cacopsis*), a species found only in Hawaii, are masters of camouflage in day light. Their mottled reddish hues blend perfectly with the rubble and lava areas of the reef they rest on during the day, in wait to ambush one of the reefs inhabitants. Night is another story though. The red which blends with the reef during the day jumps off the bottom in the beam of an underwater light.

Titan scorpionfish are also one of the many day creatures that rest at night, allowing a more intimate observation than normal. Actually the vast majority of the reefs inhabitants that are active during the day, like the titan scorpionfish, sleep at night. Most of them have favorite cracks or crevices which they retire to at dusk, and many, particularly the butterflyfish and goatfish, change to

night colors. This color change is not obvious in some species, but in others can totally change the appearance to the point where the species is unidentifiable. Once illuminated, some of the fish, like marine chameleons, will turn back into their day colors.

Several species of parrotfish, another family that sleep after the sun goes down, secrete a mucus bubble around themselves at night. During the day these fish make an extremely uncooperative subject for photographers, but once asleep will remain oblivious to the bright flash. After many night dives, I've come to realize that the cracks and crevices of the reef are more than just comfortable resting places for it's inhabitants, they are also hiding places from predators that stalk the reef at night. Just as during the day, divers must be aware not to disturb the reef and it's residents at night. Awakening a fish and sending it off into the darkness could well be sending it off to be a meal for one of the predators that specialize in feeding at night.

Moray eels and octopus are both night feeders that can be seen roaming the reefs at night. The eel's eyesight is customarily inadequate, and they rely foremost on their keen sense of smell to scrutinize their surroundings. I followed an eel for half a dive one night. It would poke its head into holes in the reef, snapping at any and all fish it found. At first, to me, it seemed like catching trout in a hatchery — an easy meal. After watching twelve attempts fail, I realized that maybe it wasn't as elementary as it appeared. Finally, the eel emerged from a hole with the tail of a butterflyfish in its mouth, snapping its jaws on the unfortunate coral citizen. The butterflyfish, still very much alive, opened its gills wide in an attempt to make itself difficult to swallow, and on the next snap by the eel, it escaped.

After many more holes and several frustrated attempts, the same situation presented itself, this time with a hawkfish. Not inclined to relinquish its second chance at a meal, the eel drove its head into the coral, clutching the hawkfish in its mouth and then proceeded to twirl like a cork screw as if it was trying to drill itself into the bottom. After three performances like this it dropped the stunned hawkfish and successfully swallowed it, this time head-first. It then immediately returned to its search, at which time I left it in my search of further marine dramas.



Opposite page top Shrimp on manybar goatfish.
Above Schooling shoulderbar soldierfish.
Left Night octopus. Below Two gobies on wire coral.



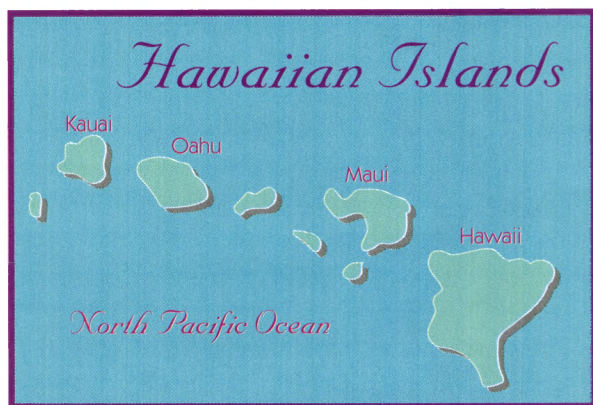
Two species of octopus are commonly seen on Hawaiian reefs, although only one during the day. Both species feed at night, and although similar in size, they are easily discernible from each other. The "night" octopus (*Octopus ornatus*) has the conventional eight arms, but they are much longer and thinner in comparison to the day octopus (*Octopus cyanea*), and as well have a noticeable bright colored pattern of dots running down them. Not as obvious is the fact that the arms are of different lengths. A day octopus has eight comparatively uniform-sized arms, while the night species has four pairs of arms, each pair being a different length.

Squid, a mid-water relative of the octopus, are usually in open ocean during the day.

In Hawaii these colorful torpedos occasionally come to the reef at night. Only a meticulous search of open water will uncover one of these extraordinary tentacled creatures. Sometimes mesmerized by a light, they will hover in one's beam, confused by the luminous aura in front of it.

One of Hawaii's most spectacular night dives is near the Kona Surf Hotel, on the Big Island, where large floodlights on shore attract unusual concentrations of plankton. Manta rays feed there on a nightly basis, filtering this rich soup just off shore. These defenseless cartilaginous relatives of sharks are not equipped with sharp tail barbs as some rays are, and at night seem oblivious to

the presence of divers. The *Kona Aggressor II*, a live-aboard dive vessel now equipped with large flood lights, has successfully recreated this phenomena, to the point of having so many mantas gliding in mid-water right off their stern that divers had to wait to enter the water. Feeding mantas look like large airport wind socks with wings attached, as they skim their gaping mouths through the water in an attempt to gather the greatest volume of microscopic morsels possible. Too large to swallow, and too clumsy to be a problem, the



mantas swim circles around divers who will never forget this night.

Competing for a planktonic meal, soldierfish replace the clouds of butterflyfish that hang over Hawaii's reefs during the day. Arcing one's dive light overhead will cause these crimson consumers to dart for the overhangs and crevices that they congregate under during the day. Corals are also night feeders, the most colorful of these in Hawaii being the tube coral or *tubastrea*. When the sun is out, these polyps look like dull brown molars attached to shaded areas of the reef. At night they extend bright orange translucent tentacles into the current, appearing as a mat of marine flowers.

Other night feeders to be aware of are sea urchins. These mobile pin cushions are

usually tucked into the reef during the day, but at night they position themselves more conspicuously on the bottom. Care must be taken to always be aware of what is nearby in the dark. A surprise encounter with an urchin can leave a painful reminder for several days afterwards.

Many invertebrates which are hidden in day light, appear at night. Hawaii is home to numerous species of

lobster. Spiny, mole, regal slipper, shovel nose and Hawaiian lobsters all roam the reefs at night. Nudibranchs appear at night, the most prominent being the dynamic Spanish dancers. It is this species that lay the red, rose-shaped egg mass I mentioned at the beginning of this article. This large nudibranch is so named because of its graceful movements when swimming, a maneuver it uses sparingly as a defense mechanism.

The most coveted of mollusks, the cowries, choose night time to forage for algae or sponge on the reef. The colorful shells fabricated by these animals are favorites of collectors, but the striking shells are not what to look for at night. The shells are covered by the inhabitant's mantle, a shell-secreting organ, that hides the animal's

colorful residence. Largest of Hawaiian cowries, the tiger cowry, at night looks more like an anemone with short tentacles that can move about the coral reef.

Some divers most memorable moments at night is not what they see in the beam of their light, but rather what they see with their lights turned off. A portion of the planktonic community can furnish a phosphorescent light show with each slight movement of a diver. This phenomena will change in intensity from night to night depending on the proportion of these tiny marine fireflies that are present. If an abundance of this plankton is available, divers will actually be outlined in a dull glow from disturbing these creatures.

I've noticed when night diving in a group that it is inevitable to have one person spend the entire dive hovering above the group with their light off. It appeared to me that one would miss a great deal by this behavior. In an attempt to understand this conduct I have questioned these no-light night divers, speculating that there must be a common personality trait, or something I'm missing. The most frequent response is, "that it's just too incredible being there to have to mess with the light!"

Regardless of your motivation for indulging in scuba at night, next you find yourself in Hawaii, forfeit the mai-tai's one night and experience the mid-Pacific's marine night life. You'll wake up the next morning with no hangover, other than a little surplus nitrogen, and fond memories of the previous night. 🐢



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WHEN WOMEN DIVE

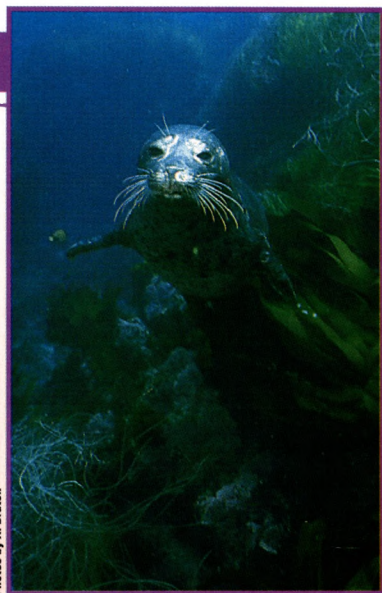
A FEMALE'S GUIDE TO BOTH DIVING AND SNORKELING

This book is designed to assist women everywhere who have considered learning to dive as well as those who have already embraced the sport of diving. It examines many diving subjects from the standpoint of how they affect women. by Erin O'Neill & Ella Jean Morgan

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Photos by Al Bratton



TAXONOMY

Kingdom:	Animalia
Phylum:	Chordata
Class:	Mammalia
Order:	Carnivora
Suborder:	Pinnipedia
Family:	Phocidae
Genus:	<i>Phoca</i>
Species:	<i>vitulina</i>

Harbor Seals

Curious Creatures of the Ocean Realm

by Robert von Maier

In my last column I discussed various taxonomical, morphological, and physiological characteristics of sea lions. With this column, however, I'll elaborate a bit on many of the same characteristics of a related pinniped – the harbor seal (*Phoca vitulina*).

Harbor seals are somewhat smaller than sea lions. As adults, the males average 5-6 feet long and approximately 250-300 pounds, with females being slightly smaller. Additionally, they do not possess external ear flaps (a characteristic of the family Phocidae) as do sea lions.

The coloration pattern of *P. vitulina* is dramatically spotted and mottled. There have been two subspecies described in the literature: *P.v. richardi*, which ranges from Herschel Island in the Arctic, and the Bering Sea, south to Monterey, California; and *P.v. geronimensis*, which ranges from Santa Barbara, California south to San Geronimo Island, Baja California. The northern subspecies is typically silvery-grey with black spots, and the southern subspecies is black or brown with silvery or white or yellowish spots. However, there is considerable diversity in the coloration of each. Because of their color patterns, they are sometimes referred to as "leopard seals." (Note: The validity of the aforementioned subspecies is currently being debated by some researchers. It is suggested that the subspecific division, based primarily on morphological differences, is unwarranted.)

Unlike their sea lion relatives, harbor seals are extremely well adapted to withstand cold. They are equipped with a thick epidermis (outer layer of skin), a thick layer of blubber, numerous oil glands covering the skin, and flattened hairs that make up a dense layer of fur. They are excellent swimmers and are capable of diving for extended periods. Research conducted on their diving capabilities has shown that they use a form of sonar that is analogous to that used by cetaceans

(whales and dolphins). The sonar is apparently used to located prey and may possibly serve other functions such as discerning depth and/or location.

Harbor seals are not as abundant as sea lions and are most often found in bays and harbors (hence the name). They frequently haul out on sandbars and beaches as well as rocky areas, and are occasionally observed at the mouths of rivers. They have even been recorded traveling some distance up river.

The breeding habits of *P. vitulina* have been described as polygamous or promiscuous, but they do not form organized harems as do sea lions. The pups are born in the latter part of May through July. They are most often born on land, however, in-water births are infrequently observed. They nurse for approximately 4-6 weeks.

Harbor seals have a diet that is quite similar to that of sea lions. It consists of a variety of invertebrates such as octopus, squid, and various species of shellfish, but also includes several species of fish.

Like the elephant seal (*Mirounga angustirostris*), harbor seals float in the water with only the head projecting. When executing a dive, they sink straight down in the water column, whereas sea lions perform a forward dive before descending.

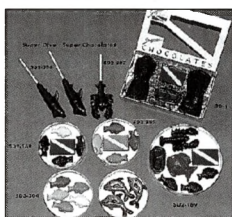
As is the case with all marine mammals, harbor seals are protected by the Marine Mammal Protection Act of 1972 (Public Law 92-522). This law makes it a federal offense to harass them in any way. Harassment is currently defined as any human activity which alters the natural behavior of the animal.

Author's Note: For additional information about harbor seals, consult *Marine Biology: Environment, Diversity, and Ecology* by Matthew Lerman, or *California Marine Life* by Marty Snyderman.

News Briefs are a service provided to the diving community. If you have information you would like to share with other divers, this section is available to you at no charge. Releases should be concise and limited to 100 words. Publication of the News Brief is not necessarily an endorsement of the item by *Discover Diving*.

Super Dive Chocolates

Super Dive expands it's gourmet chocolate collection. Chocolate masks, fins, snorkels, dive flags, knives, garibaldi, fish, sharks, and lobsters are now joined by



new dive flags and fish in pastel colors and heavenly mint flavor. Super Dive is proud to introduce the Good Luck Dolphin, a

delightful sea critter made with marzipan candy. If you like almonds, this piece is a sure winner. Individuals and retailers can

Second Annual UHMS Recreational Diving Symposium

The 1993 Undersea and Hyperbaric Medical Society (UHMS) annual conference again includes a symposium for recreational divers. The first symposium in June 1992 was highly acclaimed, and the second promises to be just as great. The 1993 symposium, with the theme "Physiology of Diving Injuries," is set for Saturday, July 10 in Halifax, Nova Scotia, Canada. Featured speakers of the symposium — selected for their expertise and their ability to communicate to divers — include Surgeon Commander Francis of the British Royal Navy, Dr. Carl Edmonds from Australia, Dr. Tom Neuman, Dr. Karen Schlitz, Dr. J. Nicholas Vandemoer, Dr. Tom Millington, and Dr. Werner Lissauer. Dr. Fred Bove will chair the event and moderate the panel sessions. The specially-selected faculty will present the latest medical information about decompression sickness, neurophysiology, lung over-expansion injuries, marine life injuries, cardiac distress, and ENT barotrauma. The symposium includes question-and-answer panel discussions at the end of morning and afternoon sessions. The success of last year's symposium makes pre-registration essential to ensure participation. Come talk to the diving medical experts of the world. The registration fee for this special symposium, which bridges the gap between medical science and recreational diving, is only \$30. To register for this outstanding event, send a check and your name, address, and phone number to Jane Dunne, UHMS, Recreational Diving Symposium (7/10/93), 9650 Rockville Pike, Bethesda, MD 20814. For more information call Dennis Graver, Symposium Director at (206) 387-8043.

contact Super Dive at (619) 945-2887 for more information.

U/W Video Workshop Schedule

Filmmaker Wes Skiles recently announced his 1993 Underwater Video Workshop schedule. "Underwater Video, Lighting and Editing", a comprehensive two day program, is open to all divers who want to improve their skills with underwater video, lighting and production. Participants can use their own equipment or equipment will be supplied for no additional charge. Taught at the Karst Productions Studio in High Springs, Florida, and Ginnie Springs Resort as the site for most diving and field work, the dates are Mar. 13-14, Mar. 25-26, Apr. 1-2, Apr. 10-11, and May 1-2. Contact Karst Productions at (904) 454-3556 days, (904) 454-3749 eves.

Changes at College of Oceaneering

The College of Oceaneering has improved courses dramatically to accommodate those who wish to change careers but must work to meet financial obligations. The new program is four hours per day a four days per week. This allows students to work while preparing for a professional diving career in hard hat diving. Courses are offered in U/W inspection, U/W welding, or diver medic. Since the hurricane in the Gulf of Mexico, job opportunities for those willing to relocate have never been better! If you've been consider

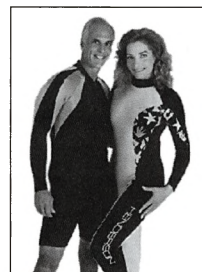
ing a career in commercial diving call the College of Oceaneering at 800-432-DIVE or 310-834-2501. Tell them *Discover Diving Magazine* sent you!

Sherwood Honors Distributor

Sherwood, a division of Harsco Corporation, recently awarded Cramer-Decker Inc., of Irvine, California, their 1992 Scuba Distributor of the Year award. The presentation was made recently at the DEMA show in Orlando, FL. Presenting the award to Bill Decker of Cramer-Decker were K.F. Bruch III, President of Sherwood, and Fran Skop, Sherwood's Vice President of Marketing. Sherwood is a manufacturing company specializing in gas control equipment for scuba diving, life support systems, and various applications in the propane and compressed gas industries. *Congratulations to Cramer-Decker!!*

Henderson Polartec Jumpsuits

Designed for warm water diving, the new Henderson Polartec Jumpsuits are available in shorty and full length styles for both men and women. The Jumpsuits are velour lined with heavy duty nylon/lycra exterior and a stretchy wind-proof/breathable membrane. Ask for Henderson Polartec Jumpsuits at your local dive store.



"Thanks for breaking the mold" – Force Fin

I am a coral biologist affiliated with the Bolinas Marine Lab near San Francisco, and am currently on the United Nations field staff in the Bay Islands of Honduras. In conjunction with the Oceanic Society, I am conducting a research study on the coral population of Roatan, assessing both species diversity and current health. I am also a PADI Instructor and have been diving for 18 years.

This project requires a rather concentrated diving effort, spending a lot of time in the water. Three years ago, I was so fed up with toe chafing in my old fins that I was looking for some kind of relief for my poor toes. Your Force Fins looked like the perfect answer. Well, I am happy to say that they are probably the single best improvement I have made in my diving equipment. Not only has my toe chafing problem been eliminated, but any kind of cold water cramping has gone away, and my effort level has gone down, thus reducing my air consumption. Also, being small, they are easy to maneuver around in tight places on a reef without touching any of the coral, making both observation and photography easier. Plus they are so convenient to pack! And interestingly enough, when I did the Instructor Development Course, one of the qualifications we had to fulfill was a mask, fins and snorkel distance swim for time. While many of the other candidates ran out and purchased mega-fins, I stuck with my Force-Fins. To everyone's amazement I had the fifth fastest time out of 78 people! Needless to say, I enthusiastically recommend Force Fins to all the participants in my research project.

Thanks for breaking the mold and making a wonderful product.

Best Regards, David Wilhelm, Marine Naturalist/Underwater Photographer/Scuba Instructor

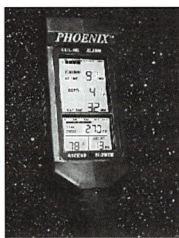


Sport Chalet and American Oceans Campaign Joint Clean-up Effort

Sport Chalet and American Oceans Campaign (AOC) have teamed up in preparation for a series of Underwater Beach Clean-Ups for southern California scuba divers. Southern California-based Sport Chalet (a sporting goods chain with the largest dive retail sales in the United States) and Santa Monica-based AOC (a non-profit, oceans advocacy group) plan to devote every Saturday in the month of April 1993 to 'diving for trash'. Sport Chalet and AOC intend to include as many southern California divers as possible by beginning the month long event in San Diego County, at Mission Bay on April 3, followed by Newport Beach Pier in Orange County on April 10, the Malibu Pier in Los Angeles County on April 17, and finishing off the month's activities by diving in Ventura County on April 24. Divers and non-divers are invited to spend at least one Saturday in the month of April 'diving for trash'. For more information contact the dive department at Sport Chalet (310) 657-3210 or Coreen Larson at American Oceans Campaign (310) 576-6162.

Phoenix with Audible Alarms

A new version of the successful Phoenix will include alarms to warn of low tank pressure and ascent rate violations. The alarms have been specially designed to not "annoy" divers and will not sound while the diver is on the surface. Each alarm sound is distinguishable from the others so that the diver does not have to look at the computer to know what it is telling them. This model will be available in March 1993. Like the standard Phoenix, this model with feature 300 fsw depth capability, full decompression and the ability to display the last 35 hours of diving history using the ORCA DataReader. Inquiries should directed to the ORCA Division of EIT, Inc. (703) 478-0333.

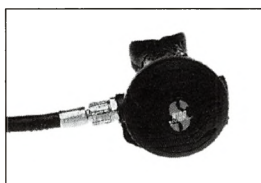


Oops!

In the February 1993 issue we incorrectly stated the distributor for the Hasselblad H38 housings. For more information on the new housing, please contact Hasselblad directly at (201) 227-7320.

Scubapro R190 Second Stage

Mix a traditional downstream valve with high flow V.I.V.A. and the results are awesome. That is exactly what we did with the R190 second stage. The downstream demand valve design was first developed in 1963 and has been upgraded and improved upon ever since. Why did this valve design keep coming back? Because nothing beat



it for dependable, reliable service. In 1991, the fourth generation was developed with one

major change; we added diver controlled V.I.V.A. and boosted the R190 into the ranks of high flow performance. The R190 is available as a second stage only or in combination with the Mk2 and Mk10 first stages. Any way you put it together, the results are time-proven dependability, performance, and economy. For your nearest Scubapro dealer call: 1-800-GO-SCUBA.

PADI Certs Increase Again in 1992

Professional Membership Surpasses 50,000

Scuba diving continues to grow, according to statistics released by PADI today. PADI certifications issued worldwide once again exceeded half a million in 1992, totalling 515,628. This represents a 12 percent increase in the total number of PADI certifications compared to 1991 totals. Florida continues to lead the United States with the highest number of PADI certifications followed by California, Texas, New York and Illinois. Strong growth in certifications was also reported by each of PADI's seven international offices.

PADI certifications issued to women continued to grow worldwide in 1992, increasing by more than six percent over the total of just five years ago. There were 25,000 more certifications issued to women in 1992 than in 1987. In the United States, close to 100,000 female divers received certifications last year. There also appears to be no upper age barrier in becoming a PADI-certified diver, according to the 1992 totals. During the year, close to 5,000 new divers over the age of 50 received a PADI Open Water Diver C-Card. Of those, almost 100 were over 70, and two were 86 years of age.

The number of PADI professional educators worldwide also increased in 1992. By year-end, there were more than 50,000 PADI Instructors, Assistant Instructors and Divemasters active in the scuba industry. For more information about PADI certification and a list of PADI Dive Centers worldwide, write PADI, 1251 E. Dyer Road #100, Santa Ana, CA 92705-5605.

California Chocolate Abalone Dive

Aquarius Dive Shop is pleased to announce the 9th Annual California Chocolate Abalone Dive to benefit the Pacific Grove Recompression Chamber and DAN to be held on March 27 in Monterey, California. Chocolate mollusks are planted in the depths of Monterey Bay. Prize numbers are vacuum-packed with each abalone. Prizes are donated by diving equipment manufacturers, local merchants, dive travel specialist, and other supportive companies and awarded at shore. A beach party follows the dive. Last year 717 divers searched for 400 abalones worth over \$31,000. Contact the Aquarius Dive Shop at 2240 Del Monte Avenue, Monterey, CA 93940; 408-375-1933. The entry fee is \$17 in advance/\$20 on site.

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Calendar of Events

March 6 -7 - Boston Sea Rovers 39th Annual Underwater Clinic will be held at the Copley Plaza Hotel in Boston, MA. Over 60 diving exhibits, daytime programs and an evening film extravaganza (Dr. Sylvia Earle is the master of ceremonies) will be offered to all types of underwater and outdoor enthusiasts. Contact (617) 878-8710.

March 20-21 - SEAVIEWS 93 Scuba Diving Show will inform and stimulate non-divers and divers who share an interest in the underwater world. Held at the Oakland Convention Center in Oakland, CA, the event includes two days of diving-related exhibits, fashion shows, an underwater photo display, seminars, artist's display, and a Saturday night Underwater Film Festival with Jean-Michel Cousteau as Master of Ceremonies. Contact Seaviews 93, P.O. Box 175, San Lorenzo, CA 94580-0175; (510) 278-6119.

May 7-9 - Our World-Underwater XXIII will be held at the Hyatt Regency O'Hare in Rosemont, Illinois. With seminars, exhibits, Try-SCUBA, film festivals, dances, and a Casino Night, whether you dive or not this is a don't miss event!! For more information and tickets contact Our World-Underwater, P.O. Box 4428, Chicago, IL 60680; 312-666-6525.

May 14-16 - Scuba '93 The Dive Show will be held at the Disneyland Hotel in Anaheim, California. The show will consist of a large exhibit area, continuous underwater film festival, seminars, exhibitor presentation, door prizes and a Saturday Night Casino Party Benefit. Show hours are Friday 6 p.m. to 9:30 p.m., Saturday 10 to 7 p.m., and Sunday 10 to 5 p.m. Admission is \$7 with discount coupons available at California dive stores. Age 10 and under are admitted free with paying adult. Contact (310) 792-2333.

May 22 - The County of Los Angeles Inter-Agency Scuba Dive Committee is pleased to announce the **Diver Rescue Workshop** to be held at the Loews Hotel in Santa Monica, California from 8 a.m. to 5 p.m. Limited to 200 participants, the early registration fee (before May 14) is \$35, and the on-site fee is \$45 and includes lectures, rescue demo, techniques and practice, lunch, t-shirt and certificate of participation. For more information, contact Tracey at the Underwater Unit Office (310) 327-5311.

nights, April 30 to May 14, 1992. Call Landfall Productions for additional information at (800) 525-3833, CA (510) 794-1599.

Rite Bite Mouthpieces Now in Black

Rite Bite Mouthpieces are available in three sizes for a more comfortable fit. Designed according to the natural position of the jaw and teeth, Rite Bite fits better, feels more comfortable and secure, and nearly eliminates jaw fatigue. Created by dentist and avid diver Don Kinkade, DDS,

Rite Bite Mouthpieces are made out of C-flex, a FDA approved, flexible elastomer. Rite Bite is available in caring scuba outlets nationwide, Canada, and a few overseas countries in clear, orange, and now black. For more information, contact Rite Bite at (303) 353-1324; (800) 669-BITE.

East Africa Adventure

Tropical Adventures Travel enthusiastically announces the release of their new 16 page brochure on dive safaris to magical East Africa. The emphasis on diving is by

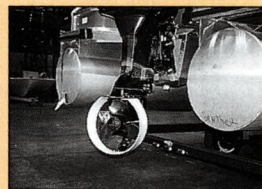
live-aboard vessel cruising the big dropoff, blue water regions of northern Zanzibar Island, in the Indian Ocean. Five years in the planning, Tropical Adventures is the only North American company to have obtained all the necessary permits to dive this extremely remote region. All diving expeditions are preceded by stunning beautiful photo safaris throughout the best gaming regions of Kenya, Tanzania, Rwanda and Zimbabwe. To receive their complete East Africa diving brochure contact Tropical Adventures Travel (800) 247-3483 or (206) 441-3483.

SS Thorfinn Special Techniques for Photographers

1993 sees S.S. *Thorfinn* in its seventh year of cruises in Truk Lagoon. Over the years *Thorfinn's* dive techniques have evolved to allow photographers to enjoy optimal conditions on the famed wrecks.. *Thorfinn's* one-week Sunday to Sunday cruises offer up to five dives each day for only \$1540 per person. For each of their five dives, *Thorfinn* sends out up to four separate 24 foot speedboats to four different wrecks. Each speedboat has no more than six divers, a particular advantage on Truk's silt-covered wrecks. With a huge, sumptuous salon, a hot tub and sinful amounts of food, *Thorfinn's* popularity is easily understood. For further information or to book your Micronesia adventure, contact See & Sea Travel Inc., 50 Francisco St. #205, San Francisco, CA 94133; Tele 415-434-3400, FAX 415-434-3409.

Attaboys for Prop-Mate!

You may have seen our product, Prop-Mate, over the past few years. Our product appeals to divers who want protection and also increased maneuverability for their boats. Recently we installed Prop-Mate guards on many pontoon boats here in Lake Arrowhead, California where we are located. We have received only excellent reports on their performance. I'm sure the accompanying letter will explain why. Some boats



had 150 H.P. motors. The owner of the pontoon boat pictured reported an increased speed and a great help maneuvering in heavy weeds. We strongly feel that for pontoon boats, "Prop-Mate" is a must!

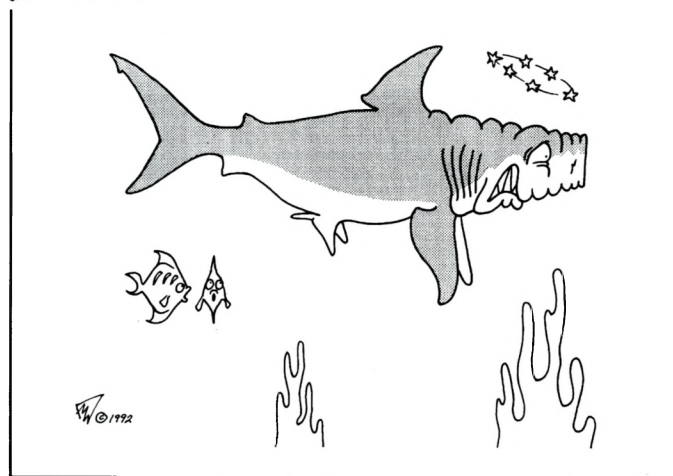
Dear Bill Flood and Prop-Mate:

We just wanted to drop a note and let you know how pleased we are with our Prop-Mate. As you

know it is on our 24' Party Barge before the Prop-Mate our boat at low speeds stirred much like a sick whale, now with the Prop-Mate on the engine it steers, well not like a porpoise but I'd say a 70-80% increase in movability from before. At high speed I could not notice any difference. Having our two small children, ourselves and friends swimming off the back of the boat, the guard on the propeller is an extra safety advantage as well as for any unseen rocks! Feel free to have anyone contact us to view the boat or go for a ride. Again thank you for your professionalism & above all it's a great product.

Sincerely yours, Zan J. Jak III, Mountain View Landscaping, Cedar Glen CA
(note: The Party Barge is a Tracker 24 with a 60 HP Evinrude motor with a 14" diameter propeller.) For more information on a Prop-Mate for your boat, call (714) 337-1142.

BENT / Mark Weinhold



And that was the day Morton learned of the false promise of glass bottom boats.

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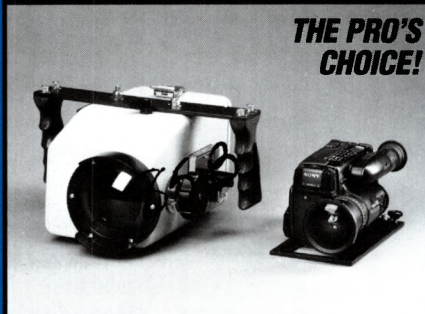
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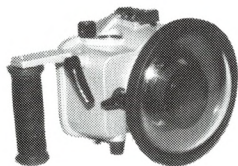
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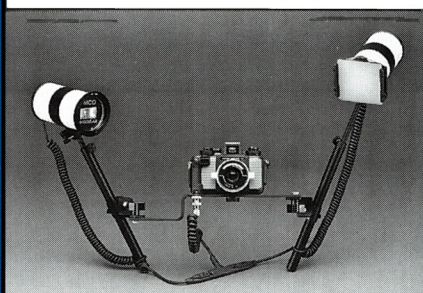
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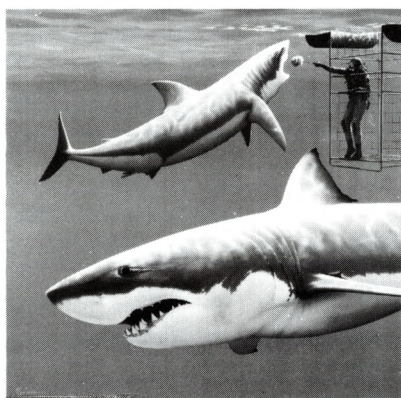
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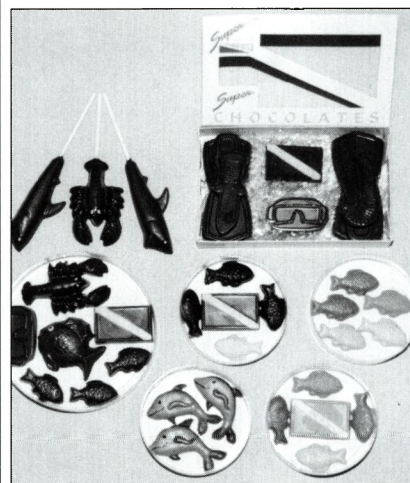
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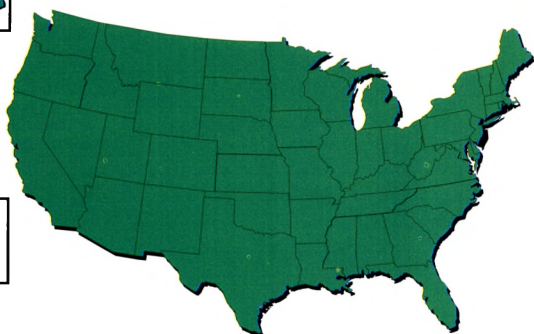
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The Last Dive

We were finishing up a great week in Cozumel. It was our last day of diving. The morning was cloudy and rain. No problem, we were going to get wet anyway. Our first dive was on a beautiful wall at 80 feet. It was a fantastic dive and we all enjoyed it. While we were doing our surface interval, the sky off in the distance started getting dark. We asked our divemaster if we should continue with the second dive. He said he didn't think the storm would hit until the next day. So off we went on our last dive of the trip; thankfully not our last dive, ever.

It was a great dive at about 45 feet for 50 minutes. We saw two large green morays, an octopus, four large barracuda, a school of queen angelfish, and an assortment of other beautiful fish. We got some great pictures and had a great time. At our three minute safety stop at 15 feet we noticed the seas had gotten rougher. No big deal, we've handled waves before. Then boats started flying by overhead, too close for comfort.

Our divemaster ascended first, using his alternate air source to let out a large stream of bubbles to signal the boats above that divers were coming up. We followed close behind him. When we got to the surface there were heavy rains and seven-to-eight-foot swells. The dive boats were getting frantic trying to get their divers safely back on board. We yelled to the nearest boat and told him the name of our boat. He got word to our captain who soon came to get us. The captains all worked together to get everyone out of the water as quickly as possible. My husband and I were grateful that we had our new BC's on. We had just bought them before this trip. My old BC, would not have had enough lift to keep me up against those waves. My new BC, a Zeagle, had more than enough lift even with my weights still on.

After everyone was in the boat we started making our way back. It didn't seem too

bad at first. The rains were cold and we were tossed around a lot, but we felt safe. On the way we spotted two capsized boats. At the first one, there were several people in the water. We helped pull three onto our boat. One of the divers was panicky. She was seasick and having trouble swimming. She could not help herself at all. When we got all of them on to the boat I found it very disturbing to note that two of the divers still had their weight belts on. The other divers from the same boat were being helped by another boat so we continued on our way.

Shortly after that we saw another capsized boat, a much larger one. We didn't see anyone in the water. There were a few people on the shore not far from the boat. We soon heard ambulances making their way to the shore where these people were. We didn't see any way we could be of assistance and help was on the way, so we continued on.

After seeing capsized boats and people in the water my husband and I decided to put on our BC's, mask and snorkel. We encouraged the others to do so. We started singing the theme from Gilligan's Island to lighten the mood. We still had an hour's ride ahead to make it to the nearest harbor. Then the difficult part came when we had to get through the rough water to get into the harbor. At that time the rest of the people in our boat put their BC's on.

There was much cheering and clapping when we finally made it into the harbor. There were no casualties on our boat except for a mask that must have floated off when one of the large waves washed over the stern. The next day we heard five boats capsized, two people died, and eight people were lost. (It should be noted that these rumors are unconfirmed.)

When we had first started diving about five years ago, we got our equipment from a discount scuba place to save some money. As a result, we got second rate equipment. We were very glad that we had recently upgraded

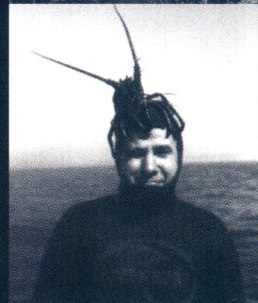
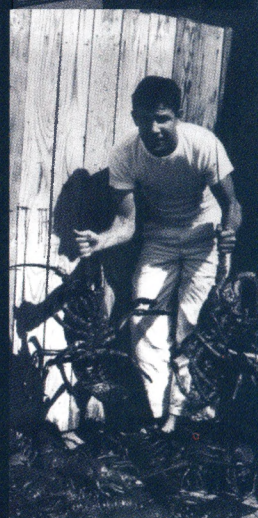
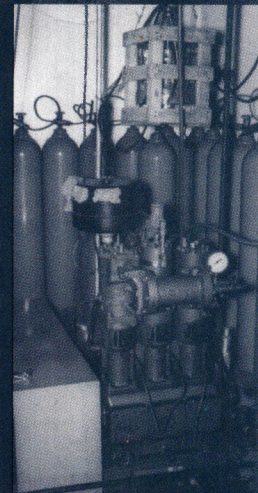
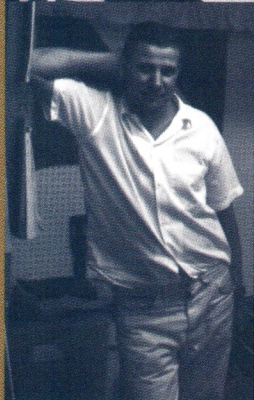
our BC's. Even though our boat didn't capsize we felt better just knowing that even if it did, we could make it safely to shore. It doesn't pay to save money by skimping on your equipment. Your life depends on your equipment. Go to a reputable dealer when you are deciding on what equipment to buy. The advice they give you will more than outweigh the additional cost.

Your education is also very important. I recommend that everyone take a rescue course. This course gives you a lot of valuable information, not only to help others but to help yourself. Even though our BC's were more than adequate to keep us afloat in the rough waves we encountered, my husband and I still had our hands on our rip cords ready to drop our weights the minute we felt the slightest bit apprehensive. You should never be thinking about the cost of those weights. Are they worth your life?

You should also never be afraid to look like a fool. My husband and I must have looked pretty silly sitting in a boat all suited up while the other nine passengers weren't. Who would have looked stupid if the boat had capsized? It's better to be safe than sorry.

Would I still go back? Definitely. We will probably be going back in April. What would I do differently? I would ask my divemaster to check the weather report on the radio before going on the second dive. I would never have taken my BC, mask, snorkel, and fins off. Most of the best dive spots are in out-of-the-way places in lesser developed countries. We didn't see any rescue boats or helicopters dispatched to help the passengers of the capsized boats. You have to be able to help yourself. This includes having adequate equipment and being prepared for problems that may occur.

by Elizabeth Hansen



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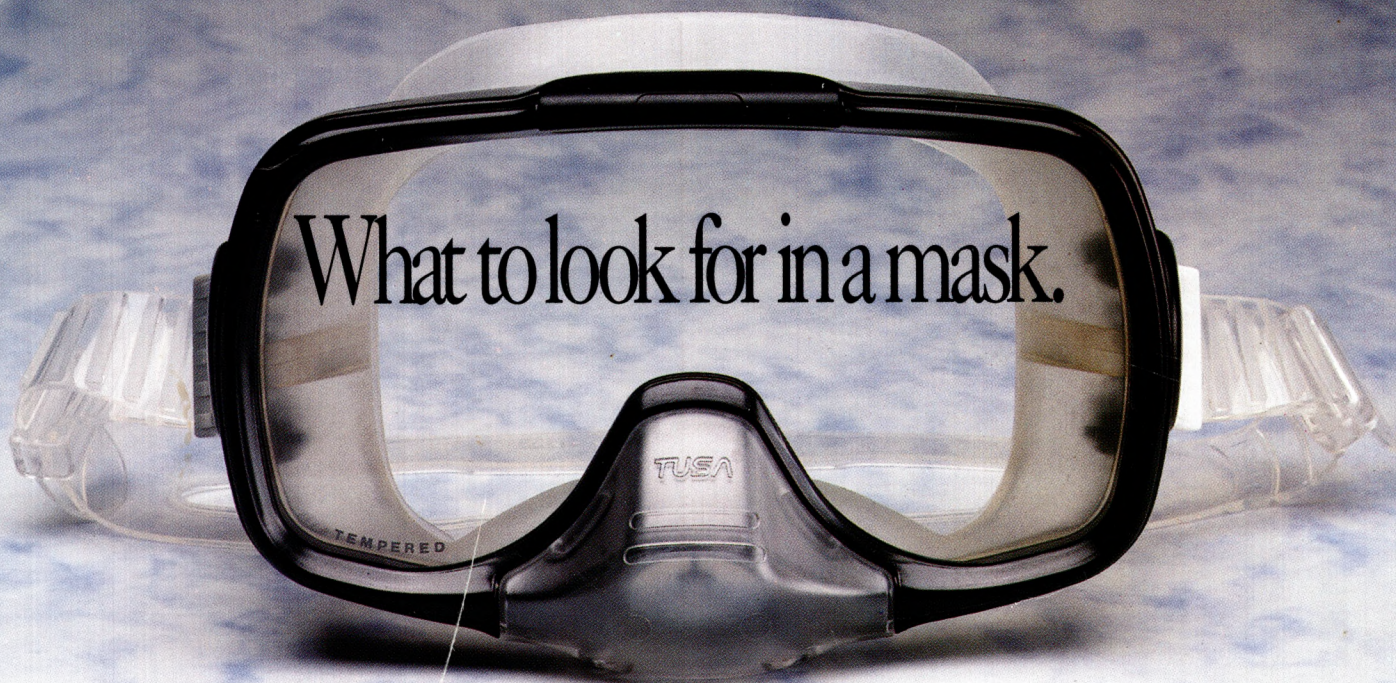
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Whether you're a vacation snorkeler or a serious professional diver, your mask is the most important piece of equipment you'll ever own. The right fit—and the right mask—can make the difference between hours of frustration and hours of fun.

So take the time to try on several masks.

Put the mask over your nose and eyes and breathe in. When it stays in place with a perfect seal, you've found the right fit.

If you have lots of facial hair, you should look for a good crystal silicone skirt. The feathered edges on TUSA masks make for a particularly good fit.

If you have a small face, you may find a twin-lens mask, like the Liberator, fits best. If you need vision correction, this mask has snap-in lenses already made in your prescription.

If you don't like any water in your mask, you should try the new Hyperdry mask, with a

hands-free purge valve to clear it any time.

Serious divers may look for the increased peripheral vision found in a Hyperform mask.

Every diver should look for a comfortable fit—and the new swivels on TUSA masks make them easy to adjust to any size or preference.



And fins.

There's only one reason to use any fin—and that's increased power with the least effort. Most dive shops recommend a flexible fin, like the new Hyperform. Layered construction and the best materials make this a fin that can stand up to all kinds of conditions and last for years.

Check that straps and buckles are easy to slip into, easy to



release, and easy on your ankles. Then don't forget to match the colors to the rest of your gear.

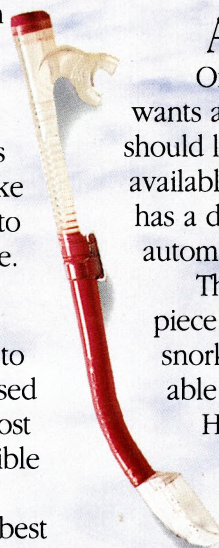
And snorkels.

Of course, every snorkeler wants air, not water, so you should look for the driest system available. The Hyperdry snorkel has a double valve for easy, automatic clearing.

Then check that the mouthpiece fits comfortably with the snorkel at the most comfortable angle. Hyperdry and

Hyperform snorkels both have a choice of mouthpieces and a swivel to adjust to your face and style.

Actually, fitting all your diving gear is a fairly simple process. Start at a good dive shop, take your time, and ask for TUSA.



TUSA